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**CLARK FORK RIVER
MACROINVERTEBRATE COMMUNITY BIOINTEGRITY:
2000 ASSESSMENTS**

prepared for
**Montana Department of Environmental Quality
Planning, Prevention and Assistance Division**

prepared by
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June, 2001

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SUMMARY

The Montana Department of Environmental Quality has conducted annual macroinvertebrate surveys in the Clark Fork River Basin since 1986. Each August, we assess biological integrity to evaluate water quality at 25 to 28 sites from the headwaters to Thompson Falls Reservoir. Our analysis was developed specifically for the Clark Fork River drainage and compares each station to a fixed reference condition. The analysis integrates ten measures of macroinvertebrate structure and function into a single index of biological integrity. In addition, metric subsets estimate the relative severity of metals and nutrient/organic pollution. In this report, the 2000 data are analyzed and temporal trends are evaluated. A detailed picture of environmental health and water quality trends over the past 15 years is presented.

Macroinvertebrate-based bioassessments indicate widespread pollution in the Clark Fork River drainage. On a scale of 0 to 100% (with values greater than 90% indicating nonimpairment), individual site assessments have ranged from 13 to 98%. Biointegrity is lowest and severely impaired in upper Silver Bow Creek. Benthic assemblages are much healthier below the Warm Springs Ponds and biointegrity in the upper Clark Fork River is usually classified as slightly (90 to 70%) or moderately (70 to 50%) impaired. Downstream from the Little Blackfoot River, the Clark Fork River is generally slightly impaired. High biointegrity scores indicate excellent water quality in the Little Blackfoot River, Rock Creek, and the Blackfoot River.

Nutrient and organic pollution are the principle cause of biological impairment in most of the Clark Fork River Basin. Nutrient and organic pollution suppress biointegrity throughout the Clark Fork mainstem and in the lower reaches of Flint Creek and the Bitterroot River. Impacts to the benthic community are generally slight. However, moderate impacts are sometimes detected in Silver Bow Creek below the Butte municipal wastewater treatment outfall and below the Warm Springs Ponds. Increased nutrient/organic pollution is also evident in the Clark Fork River near Deer Lodge and from the confluence of the Bitterroot River to Huson. Impacts in the Deer Lodge Valley are primarily attributable to nutrient and organic loads from the Warm Springs Ponds and nonpoint sediment sources and are accentuated by low summer stream flows. Impacts in the lower river are attributed to nutrients from the Missoula WWTP, the Bitterroot River, the Stone Container kraft mill, and groundwater.

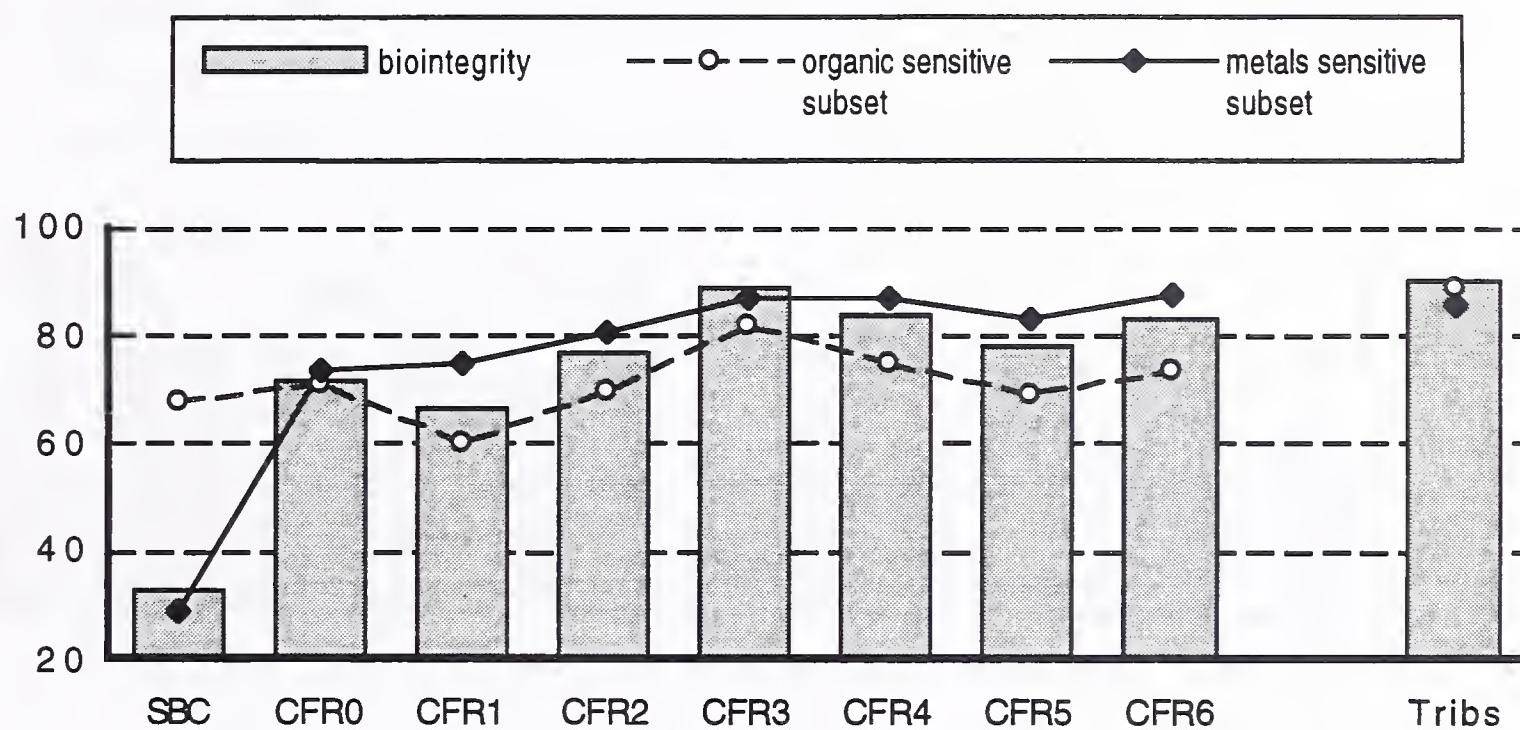
Metals pollution has been indicated in the Clark Fork Basin from Butte to Missoula. The degree of metals impairment has varied both spatially and temporally. Severe impacts were evident in upper Silver Bow Creek on all dates. Prior to 1993, slight metals pollution was usually detected in the Clark Fork from the Warm Springs Ponds downstream to the confluence of Rock Creek and occasionally indicated as far downstream as Missoula. Since 1993, impacts attributable to metals have diminished in the Clark Fork mainstem and have usually been limited to slight impacts from Deer Lodge to the confluence of the Little Blackfoot River. However, metals pollution was more widespread in the Clark Fork River during 1997 when metals caused moderate biological impairment in the lower Deer Lodge Valley and slight impairment downstream to Turah. Increased metals pollution was attributable to elevated metals loading associated with higher peak flows in 1997.

Biological integrity has improved at six stations in the upper basin since 1993. Significant trends are evident in Silver Bow Creek, Mill-Willow Bypass, Warm Springs Creek, and in the Clark Fork River from Warm Springs Creek downstream to Dempsey (CFR0). Improved biointegrity at these sites is primarily attributable to a reduction in metals pollution that coincided with remediation activities at the Warm Springs Ponds, in the Mill-Willow creeks bypass channel, and in the Warm Springs Creek drainage. Recent biological monitoring indicates that water quality declines in the Clark Fork River from the Warm Springs Ponds through the Deer Lodge Valley.

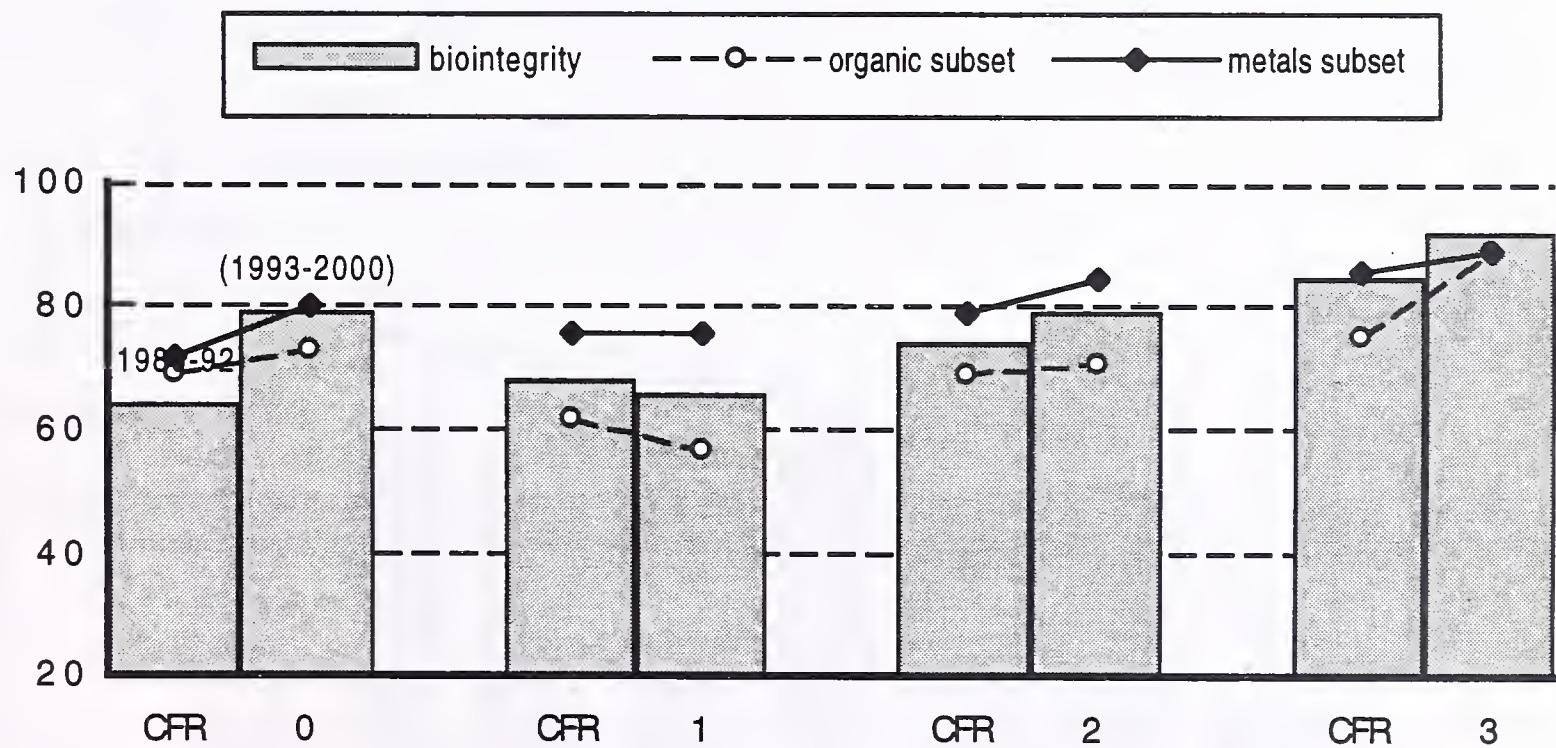
In 2000, biointegrity was well above average throughout the Clark Fork River Basin although pollution was still indicated at 11 of 28 monitoring stations. Upper Silver Bow Creek remained severely impaired by metals, nutrient, and organic pollution. However, metals pollution was not indicated in the remainder of the study area. This marks the first year that significant metals pollution was not detected in Silver Bow Creek below the ponds or in the Clark Fork mainstem.

Only minor reductions in biological integrity were indicated elsewhere in the basin. In the upper river, Silver Bow Creek below the Warm Springs Ponds, and the Clark Fork River from Deer Lodge to the Little Blackfoot River and at Bearmouth were slightly impaired by nutrient pollution. The Clark Fork River at Bonita was moderately impaired by nutrient pollution and low stream flow. Downstream from Missoula, the Clark Fork at Shuffields and the Bitterroot River were slightly impaired. The remainder of the Clark Fork was nonimpaired (from Warm Springs Creek to Sager Lane, from Rock Creek to Missoula, and from Harper Bridge to Superior). With the exception of Flint Creek, biological integrity was also nonimpaired in all other tributaries. Overall, the Clark Fork River Basin appeared to be healthier in 2000 than at any time since monitoring began in 1986.

Mean biointegrity (%) in Clark Fork River Basin stream reaches during August, 1986-2000. Metals and organic scores based on metrics considered most sensitive to each type of pollution.

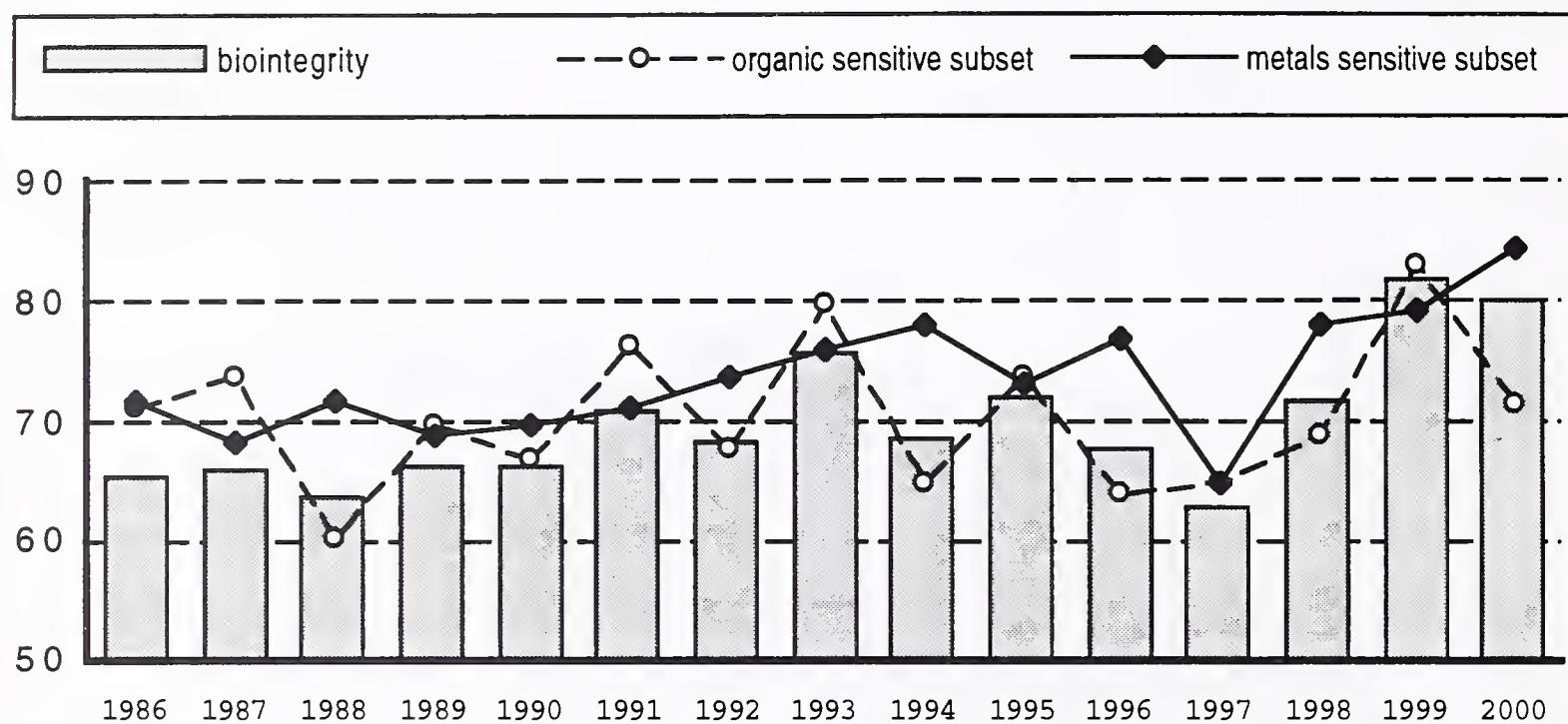


Mean biointegrity (%) in four reaches of the upper Clark Fork Clark Fork River from 1986 through 1992 and 1993 through 2000. Metals and organic scores based on metrics considered most sensitive to each type of pollution.

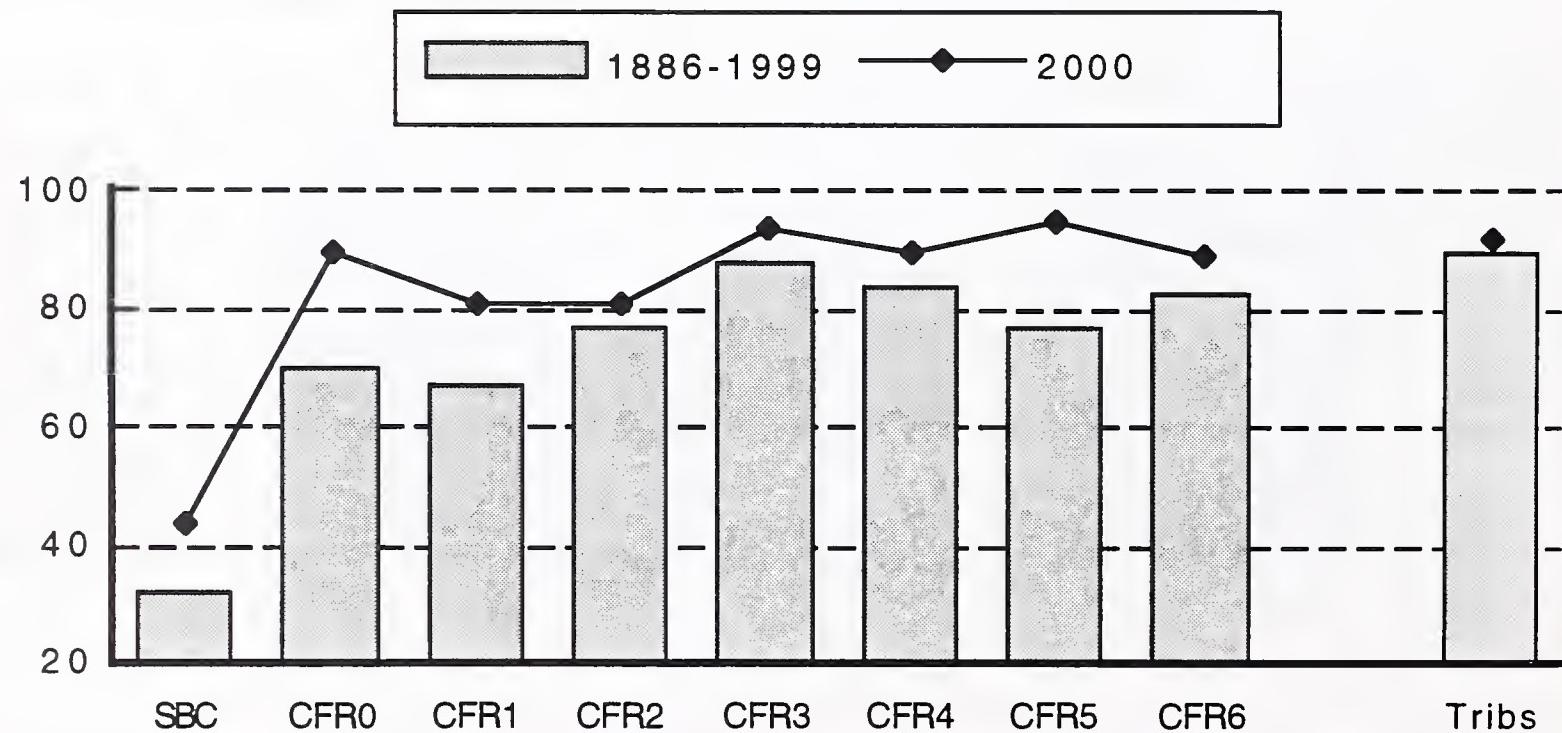


Stream reaches: SBC = Upper Silver Bow Creek, CFR0 = Warm Springs Ponds to Sager Lane, CFR1 = Deer Lodge to Little Blackfoot River, CFR2 = Little Blackfoot River to Rock Creek, CFR3 = Rock Creek to the Blackfoot River, CFR4 = Milltown dam to the Bitterroot River, CFR5 = Bitterroot River to Alberton, CFR6 = Alberton to the Flathead River, Tribs = Warm Spring Ck., Little Blackfoot R., Flint Ck., Rock Ck., Blackfoot R., and Bitterroot R.

Mean biointegrity (%) in the Clark Fork River Basin during 15 years of monitoring (20 stations; 80 samples per year). Metals and organic scores based on metrics considered most sensitive to each type of pollution.



Mean biointegrity (%) in Clark Fork River Basin stream reaches during August, 1986-1999 and 2000.



Stream reaches: SBC = Upper Silver Bow Creek, CFR0 = Warm Springs Ponds to Sager Lane, CFR1 = Deer Lodge to Little Blackfoot River, CFR2 = Little Blackfoot River to Rock Creek, CFR3 = Rock Creek to the Blackfoot River, CFR4 = Milltown dam to the Bitterroot River, CFR5 = Bitterroot River to Alberton, CFR6 = Alberton to the Flathead River, Tribs = Warm Spring Ck., Little Blackfoot R., Flint Ck., Rock Ck., Blackfoot R., and Bitterroot R.

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1. INTRODUCTION

The Montana Department of Environmental Quality (MDEQ) conducts annual macroinvertebrate surveys as part of a comprehensive environmental surveillance program of the Clark Fork River Basin. In 1986, the program expanded from a water quality study of the lower 230 miles of the Clark Fork River (Ingman 1985) into the headwaters of the Clark Fork Basin. Each August, macroinvertebrates are collected at 25 to 28 stations along a 300-mile reach from Silver Bow Creek to Thompson Falls Reservoir. Data from 2000 are presented in this report.

Macroinvertebrates are good indicators of water quality and are commonly used to evaluate environmental impacts to streams. Healthy streams support diverse assemblages of mayflies (Ephemeroptera), stoneflies (Plecoptera), caddisflies (Trichoptera), true flies (Diptera), beetles (Coleoptera) and many others. These organisms provide energy pathways from primary producers (algae) and organic material to consumers (fish, humans, etc.). As integral components of stream ecosystems, macroinvertebrate assemblages reflect the cumulative impacts of all pollutants. Toxic substances, organic pollution, and excessive sediment loading produce characteristic changes in the macroinvertebrate community. These responses can be used to document the type(s) and degree of pollution.

Macroinvertebrate-based assessments can be used to quantify ecosystem health or, its converse, environmental degradation. Biointegrity has been defined as "the capacity of supporting and maintaining a balanced, integrated, adaptive community having species composition diversity and functional organization comparable to that of natural habitat of the region" (Karr and Dudley 1981). This concept has been refined to incorporate both ecological integrity and human values by Meyer (1997) who describes a healthy stream as "an ecosystem that is sustainable and resilient, maintaining its ecological structure and function over time while continuing to meet societal needs and expectations".

The analysis used in this report was specifically developed for the Clark Fork River Basin. Annual evaluations of aquatic ecosystem health are made at 25 to 28 sites and longitudinal and temporal trends are evaluated (McGuire 1987, 1989a, 1989b, 1993, 1995, 1997, 1998, 1999, 2000; McGuire and Ingman 1996). With the inclusion of the 2000 data, a 15-year

database exists for trend monitoring at 20 stations. Six other sites have been monitored for at least eight years.

2. STUDY AREA

The study area includes Silver Bow Creek, approximately 267 miles of the Clark Fork River, and the lower reaches of nine tributaries (Figure 1). We were unable to access the Clark Fork River at Huson (station 22) during 2000. Consequently, a total of 27 locations were sampled during the most recent survey (Table 1).

3. METHODS

3.1 Field Work

Since 1986, DEQ staff and/or Erich Weber and Dan McGuire have collected benthic organisms with a modified Hess sampler (0.1 sq. meter diameter, 1000 micron mesh netting). During August of each year, four replicate samples were obtained from each station. Sampling methods are described in the DEQ's Field Procedures Manual (1996). At each site, samples were obtained from the richest, most heterogeneous cobble substrates available. Aquatic and riparian habitat was evaluated at each site in 2000. Nine parameters were visually rated using the MDEQ Rapid Bioassessment Protocol (RBP) field habitat assessment form.

3.2 Laboratory Analysis

Laboratory processing was consistent with that used in previous years. Samples were rinsed in a U.S. Standard #30 sieve to remove the preservative. A small portion of the sample was placed in a white pan divided into ten equal areas by a grid. All macroinvertebrates were removed and sorted to order. This process was repeated until the entire sample was processed. If the sample clearly contained more than 1000 organisms, subsampling was used to estimate densities of selected abundant taxa (e.g. blackflies or hydropsychids). Samples were processed as usual except that selected taxa were removed from only two randomly selected grids. The number in the subsample was multiplied by five to provide estimated density per 0.1 m² Hess sample. Organisms were identified to the lowest level practical, usually genus or species, and enumerated.

Figure 1
Clark Fork Basin
Monitoring Project

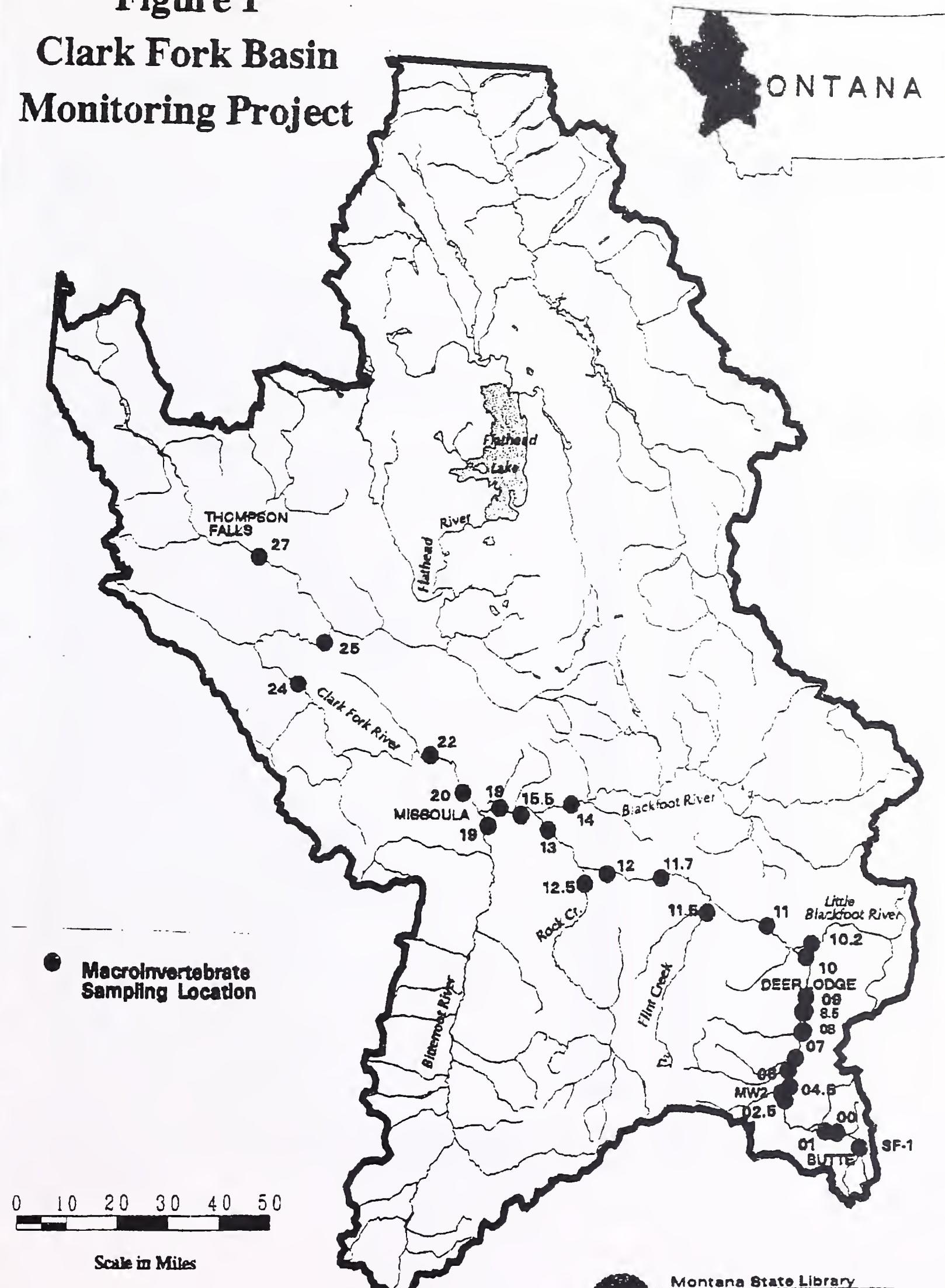


Table 1. Clark Fork Basin biomonitoring sites.

station	name	reach	period of record
SF-1	Blacktail Creek above Grove Gulch		1993 - 2000
00	Silver Bow Creek above Butte WWTP	SBC	1987 - 2000
01	Silver Bow Creek at Rocker	SBC	1986 - 2000
02 *	Silver Bow Creek near Ramsay	SBC	1986 - 1992
02.5	Silver Bow Creek at Opportunity	SBC	1993 - 2000
03 *	Silver Bow Creek above Warm Springs Ponds	SBC	1986 - 1992
04 *	Warm Springs Pond #2 discharge		1986 - 1991
04.5	Silver Bow Creek below Warm Springs Ponds	CFR0	1993 - 2000
MW-2	Mill-Willow Creeks Bypass		1986 - 1991, 1999 - 2000
06	Warm Springs Creek near mouth	TRIB	1986 - 2000
07	Clark Fork River below Warm Springs Creek	CFR0	1986 - 2000
08	Clark Fork River near Dempsey	CFR0	1986 - 1992, 1998 - 2000
08.5	Clark Fork River at Sager Lane	CFR0	1990 - 1992, 1998 - 2000
09	Clark Fork River at Deer Lodge	CFR1	1986 - 2000
10	Clark Fork River above Little Blackfoot River	CFR1	1986 - 2000
10.2	Little Blackfoot River near mouth	TRIB	1993 - 2000
11	Clark Fork River at Gold Creek Bridge	CFR2	1986 - 2000
11.5	Flint Creek at New Chicago	TRIB	1993 - 2000
11.7	Clark Fork River at Bearmouth	CFR2	1993 - 2000
12	Clark Fork River at Bonita	CFR2	1986 - 2000
12.5	Rock Creek near Clinton	TRIB	1993 - 2000
13	Clark Fork River at Turah	CFR3	1986 - 2000
14	Blackfoot River near mouth	TRIB	1986 - 2000
15 *	Clark Fork River below Milltown Dam	CFR4	1986 - 1988
15.5	Clark Fork River above Missoula	CFR4	1989 - 2000
16 *	Clark Fork River above Missoula WWTP	CFR4	1986 - 1988
18	Clark Fork River at Shuffield's	CFR4	1986 - 2000
19	Bitterroot River near mouth	TRIB	1986 - 2000
20	Clark Fork River at Harper Bridge	CFR5	1986 - 2000
22	Clark Fork River at Huson	CFR5	1986 - 2000
23 *	Clark Fork River near Alberton	CFR5	1986 - 1992
24	Clark Fork River at Superior	CFR6	1986 - 2000
25	Clark Fork River above Flathead River	CFR6	1986 - 2000
26 *	Flathead River near mouth		1986 - 1988
27	Clark Fork River above Thompson Falls Reservoir		1987 - 2000

* discontinued stations

3.3 Data Analysis

The analysis was specifically designed to evaluate water quality in the Clark Fork River Basin (McGuire 1993). The analysis incorporates 10 metrics (Table 2) into a single index of biological integrity. The metrics used in the analysis exhibit predictable responses to environmental stress and were the most suitable to the broad range of habitats within the study area. Each metric measured a different aspect of community composition, structure, or function. Since biological communities integrate the effects of all environmental stresses, this analysis provided a reliable evaluation of cumulative impacts from metals, nutrients, and streamflow alteration.

To evaluate stream health, each metric was assigned a score (0 to 6) based on its comparability to a reference value. Scores for all metrics were totaled and the sum, expressed as a percentage of the maximum possible score, was used as an estimate of biological integrity. The resulting summary score provides a reliable and easily understandable estimate of ecological health.

Metric scoring criteria reflect the range of values in the Clark Fork River Basin from 1986 through 1990. Data from the first three years (1986-1988) of the Clark Fork River Basin study and two years of data (1988-1989) from the Blackfoot River were used to establish metric scoring criteria. For each metric, statistically significant differences among stations were identified by one-way analysis of variance (McGuire 1987, 1989a, 1989b, 1990a, 1990b, Ingman et al. 1989, and unpublished data). Scoring criteria endpoints were defined by statistically distinct groups of stations with the highest and lowest scores. Nonimpaired endpoints were based on stations with the best metric scores and were generally established as the mean minus one standard deviation. On the lower end of the scale, endpoints were generally based on average values of the most severely impaired station(s).

Scoring criteria for some metrics were adjusted to improve the reliability of the assessment. The inclusion of Silver Bow Creek data resulted in wide scoring ranges for most metrics and, consequently, some statistical differences in metric values were not reflected in the scoring criteria. The lower end of the scoring criteria for taxa richness was truncated to provide better discrimination of slight impacts in the Clark Fork River at the expense of detecting slight improvements in Silver Bow Creek. Scoring criteria for percent filterers, Baetidae to Ephemeroptera, Hydropsychinae to Trichoptera, and EPT to EPTC ratio metrics were relaxed to improve the reliability of these metrics over the wide geographic area.

The biointegrity assessment sacrifices some sensitivity to subtle differences to improve reliability. In general, biological integrity in the Clark Fork Basin can be categorized as nonimpaired (90 to 100%), slightly impaired (70 to 90%), moderately impaired (50 to 70%), or severely impaired (<50%). These impairment classifications were less rigorous than statistical differences in the 1986 through 1988 Clark Fork River Basin data. Except for borderline values, scores in different narrative categories are considered significantly difference from one another.

Macroinvertebrate assemblages exhibit predictable responses to different types of environmental stress; consequently, the sensitivity of individual metrics varies with the type of pollution. Some parameters are useful as estimators of metals pollution while others are more sensitive to organic/nutrient enrichment, excessive sediment deposition, or partial dewatering. Both metals and nutrient pollution are known to degrade water quality and impact aquatic life in the Clark Fork Basin (Ingman and Kerr 1990, McGuire 1990). Therefore, subsets of metrics considered sensitive to these forms of pollution were used to estimate the relative severity of each pollutant (Table 2).

Impacts attributable to metals and nutrient/organic pollutants were estimated by the sum of scores for metrics in each subset, expressed as a percentage of the maximum possible score (usually 18). Metrics comprising the nutrient/organic subset were community density, biotic index, and the percent relative abundance of filter-feeding macroinvertebrates. The subset used to estimate metals pollution consisted of community density, EPT richness, and metals tolerance index.

A specific type of pollution was indicated when the score of one set of metrics was substantially lower than the other. To facilitate interpretation, impacts attributable to these pollutants were categorized as slight (~60 to 80%), moderate (~40 to 60%) or severe (< 40%). The more conservative classification scheme for these metric subsets reflects the limitations of an assessment based on only three metrics. The impairment classifications accurately reflect statistical differences in the 1986 through 1988 Clark Fork River Basin data. Except for borderline values, scores in different narrative categories were considered significantly difference from one another. Metrics and the rationale for their use are described as follows.

Macroinvertebrate Density

Total macroinvertebrate density is an important feature of community structure and, when carefully interpreted, can be a useful indicator of several different environmental conditions. Unusually high or low macroinvertebrate densities are considered indicative of environmental perturbation. Macroinvertebrate density tends to increase in response to organic and/or nutrient enrichment, and the magnitude of the increase reflects the degree of the pollution. Conversely, macroinvertebrate density may be reduced by toxic substances such as metals, by severe habitat degradation, or by extensive scouring.

Low macroinvertebrate densities were used as an index of metals pollution in the upper Clark Fork River Basin. Specifically, this metric was included to document toxic impacts and provide a measure of biological improvement in Silver Bow Creek. Historically, macroinvertebrates have been absent from or present at very low densities in Silver Bow Creek and the Mill-Willow Bypass (Spindler 1959, Multitech and OEA Research 1986, McGuire 1990b). Increased macroinvertebrate abundance at these sites can be considered a clear indication of reduced toxicity. This metric typically provides little information regarding environmental health in the remainder of the study area.

High macroinvertebrate standing crops were included as a metric to assess nutrient and organic loading in the Clark Fork River. Densities greater than 2,000 per sample (0.1 m^2) were attributed to organic pollution and/or enhanced primary production caused by nutrient enrichment. Given that the threshold value is 2,000 organisms per sample, it is not considered a sensitive measure of organic loading in more oligotrophic tributaries. Because toxic conditions can preclude high macroinvertebrate densities (McGuire 1990b), this metric was not used to evaluate organic/nutrient pollution when density was less than 550 organism per sample. Densities between 550 and 2,000 organisms per sample received maximum scores for both metrics.

Taxa Richness

Taxa richness, or the number of macroinvertebrate taxa per Hess sample, was probably the single best measure of environmental condition in the Clark Fork River drainage. It is a reliable measure of biological integrity because the loss of the most sensitive species to any stress affects the index. The range for scoring this metric was 14 to 40 taxa per sample. This truncated scoring range maximizes the sensitivity of this metric to small

reductions in taxa richness. Mean taxa richness in the lower Blackfoot River during 1988 and 1989 was 41 (Ingman et al 1990 and McGuire 1990a).

Shannon Diversity

Shannon diversity has long been used as an index of environmental condition (Weber 1973) and is a reliable measure of combined environmental stress in the Clark Fork drainage. This index has two components and is influenced by taxa richness and the distribution of individuals among taxa (evenness). Reference stations had an average Shannon diversity value of 3.7 with a standard deviation of 0.4. For this analysis, values greater than 3.3 were considered nonimpaired.

EPT to Chironomidae Ratio (EPT/EPTC)

This metric, originally developed by the EPA (Plafkin et al. 1989), is based on relative abundance of indicator groups. Most Ephemeroptera, Plecoptera, and Trichoptera are considered sensitive to environmental stresses while Chironomidae, as a group, are more tolerant. In the form $(E+P+T) / (E+P+T+C)$, this metric ranges from 0 to 1.

An even distribution of individuals among the four groups reflects good biotic condition while a disproportionate number of chironomids indicates environmental stress. For the Clark Fork analysis, values <0.55 indicate impairment. Using this scale, the EPT/EPTC metric reliably identifies severe biological impairment but does not consistently separate slight, moderate and nonimpaired sites. In some cases, large populations of relatively tolerant EPT taxa (e.g. Baetidae, *Tricorythodes* or hydropsychids) result in high EPT/EPTC values. The percentage Baetidae of Ephemeroptera and percentage Hydropsychinae of Trichoptera metrics are included to identify slight to moderate impairment missed by the EPT/EPTC metric.

Percent Baetidae of Ephemeroptera

Members of the family Baetidae are among the most pollution-tolerant mayflies (Hubbard and Peters 1978). Slight to moderate environmental stress is indicated when baetids comprise most of the mayfly fauna. This metric ranges from 0 to 1 with high values (>0.85) indicating biological impairment. This metric received a default value of 1 when no mayflies were collected.

Percent Hydropsychinae of Trichoptera

The subfamily Hydropsychinae is, in general, more tolerant of pollution than most other caddisflies (Harris and Lawrence 1978). Environmental stress is indicated when most of the caddisflies in a sample are *Hydropsyche* and *Cheumatopsyche*. This metric is analogous to the Baetidae/Ephemeroptera metric and ranges from 0 to 1 with high values (>0.85) indicating biological impairment. When no caddisflies were collected, this metric received a default value of 1.

Biotic Index

The biotic index is based on the indicator organism approach to water quality assessment and was developed to measure organic pollution. The index is calculated: $\text{SUM } (\%RA_i * t_i)$, where $\%RA_i$ is the percent relative abundance of each taxon and t_i is the tolerance value of the taxon. This index is on a scale of 0 to 10 with higher values indicating more polluted conditions. Tolerance values used in this study (Appendix A) were taken from Hilsenhoff (1987) and McGuire (1992).

Percent Relative Abundance of Filter Feeders

The relative abundance of functional feeding groups can provide useful insights into energy transfer, food resources and organic loading in aquatic ecosystems. Filter feeding insects typically comprise a major component of the summer macroinvertebrate fauna in Montana rivers. Relative abundance greater than 50 percent indicate high seston (suspended organics) concentrations that are usually associated with organic/nutrient enrichment, extensive filamentous algae growth, or lake outflows. This metric is used as a measure of organic pollution in the Clark Fork River Basin. Functional classifications were based on Merritt and Cummins (1984).

EPT Richness

This metric summarizes species richness of Ephemeroptera, Plecoptera, and Trichoptera and was used as an indicator of metals pollution. The majority of mayfly, stonefly and caddisfly species are highly sensitive to pollution. With a few exceptions, species in these groups are among the first to be eliminated by metals toxicity (Wiederholm 1984, Clements 1991). EPT richness averaged 21 among Blackfoot River reference stations. The scoring criteria reflect the wide range of values found within the study area. While

minimizing influences of pollutants other than toxins, the wide range reduces the sensitivity of this metric to subtle changes.

Metal Tolerance Index (MTI)

This metric quantifies changes in community composition attributable to metals pollution in the Clark Fork River Basin. The format and calculation are based on Hilsenhoff's biotic index, with tolerance values assigned to each taxon based on sensitivity to metals rather than organics. The index is calculated: $\text{SUM } (\%RA_i * t_i)$, where $\%RA_i$ is the percent relative abundance of each taxon and t_i is the tolerance value of the taxon. The theoretical scale of the index is 0 to 10 with higher values indicating communities more tolerant of metals pollution. MTI values for communities dominated by species intolerant of metals are less than 4 (i.e. Blackfoot River) while values for communities composed of only the most metals-tolerant species approach 10 (i.e. Silver Bow Creek). Small, but statistically significant differences in metric values are not reflected in assessment scores due to the wide criteria range necessitated by the inclusion of Silver Bow Creek data.

Metals tolerance values (Appendix A) for most taxa were developed from the 1987 and 1988 Clark Fork River Basin water quality (Ingman and Kerr 1989) and macroinvertebrate (McGuire 1987 and 1989a) data. Ingman and Kerr (1989) quantified metals pollution severity for each station based on the frequency and magnitude of measured copper, zinc, cadmium, and lead concentrations exceeding EPA chronic or acute criteria for the protection of aquatic life. Stations were ranked by metals pollution severity. Macroinvertebrate taxa were ranked according to their relative abundance and distributions along this gradient. Abundant taxa (comprising at least five percent of the fauna at any station) were assigned a rank corresponding to the station where they attained their maximum relative abundance. For less abundant taxa, ranks corresponded to the midpoint of their distribution within the study area. Ranks were transformed to a scale of 0 to 10, rounded to the nearest integer, and used as metals tolerance values. Some tolerance values, particularly for infrequently collected taxa, were modified based on the author's interpretation of pertinent literature (Clements 1991, Clements et al. 1988, Rolin 1988, Wiederholm 1984, Winner et al. 1980, Yasuno et al. 1985, Lynch et al 1988, Leland et al 1989).

Stream Reaches

For some analyses, the study area is partitioned into ecologically distinct stream reaches. These data were used to summarize environmental health in relatively homogeneous river reaches and to evaluate temporal and longitudinal trends using a scale of miles rather than individual sites. Eight stream reaches are currently recognized (Table 1). Reaches vary in length from approximately 10 to 70 miles and currently include from one to four sampling stations. Stream reaches include:

- SBC Upper Silver Bow Creek; from the old Colorado Tailing site to the Warm Springs Ponds.
- CFR0 Lower Silver Bow Creek (below the Warm Springs Ponds) and the upper Clark Fork River downstream to Sager Lane.
- CFR1 Clark Fork River from Sager Lane to the Little Blackfoot River.
- CFR2 Clark Fork River from the Little Blackfoot River to Rock Creek.
- CFR3 Clark Fork River from Rock Creek to the Blackfoot River.
- CFR4 The Clark Fork River from Milltown Dam to the Bitterroot River.
- CFR5 Clark Fork River from the Bitterroot River to Alberton.
- CFR6 Clark Fork River from Superior to the Flathead River.

Trend Analysis

Longitudinal and temporal trends in biological integrity within the Clark Fork River Basin were evaluated at several levels of resolution. Spearman rank correlation (Zar 1974) was used to identify temporal trends in biointegrity. Correlation coefficients (r_s) were calculated to identify temporal trends at individual stations, within stream reaches, and for the study area as a whole. For most stations, analyses were based on 60 samples obtained over 15 years. The fixed reference for all stations and years facilitated this trend analysis.

Table 2. Metrics and criteria used to determine biological integrity in the Clark Fork River Basin.

Metric	Scoring Criteria					
	6	5	4	3	2	1
General						
Taxa richness	>39	39-35	34-30	29-25	24-20	19-15
Shannon diversity	>3.3	3.3-3.0	2.9-2.6	2.5-2.2	2.1-1.8	1.7-1.4
EPT/EPTC	>.54	.54-.45	.44-.35	.34-.25	.24-.15	.14-.05
Hydropsychinae/Trichoptera	<.85	.85-.87	.88-.90	.91-.93	.94-.96	.97-.99
Baetidae/Ephemeroptera	<.85	.85-.87	.88-.90	.91-.93	.94-.96	.97-.99
Organic pollution subset						
Density	550-1999	2000-2599	2600-3199	3200-3799	3800-4399	4400-4999
Biotic index	<4.0	4.0-4.5	4.6-5.1	5.2-5.7	5.8-6.3	6.4-6.9
% Filterer	<51%	51-55%	56-60%	61-65%	66-70%	>75%
Metals pollution subset						
Density	>549	549-450	449-350	349-250	249-150	149-50
EPT richness	>21	21-18	17-14	13-10	9-6	5-2
Metals Tolerance Index	<4.0	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	>8.9
All values are per 0.1 m ² Hess sample. Each metric was scored from 0 (severe impact) to 6 (no impact). Biointegrity was estimated as the sum of metric scores divided by the maximum possible score.						
Numerical criteria for the assessment of biologically significant environmental degradation.						
classification	% biointegrity metric subsets indicating metals or organic pollution					
nonimpaired	>90% >80%					
slightly impaired	70-90% 60-80%					
moderately impaired	50-70% 40-60%					
severely impaired	<50% <40%					

4. RESULTS AND DISCUSSION

Appendix A contains tolerance values for 225 macroinvertebrate taxa found in the study area since 1986. Identifications, organism counts, metric values, and summary statistics for 2000 are presented in Appendix B. For each station, mean metric values, metric scores, and percentage biointegrity assessments were calculated for each year that data were available (Appendix C). The 2000 habitat assessment data are contained in Appendix D.

4.1 Stream Discharge

Both peak flows and mean August discharge were well below average throughout the drainage in 2000 (Table 3). Spring runoff was minimal and, in the upper Clark Fork, was the lowest recorded during the past 15 years. August stream flows were also low, but not unusually so.

4.2 Habitat Assessment

Aquatic and riparian condition was evaluated in 2000 using the MDEQ Rapid Bioassessment Habitat Field Evaluation (Bukantis 1998). Based on visual observations, 9 habitat parameters were rated (Appendix D). These data do not represent a quantitative habitat assessment. However, they provide a means of ranking stations by overall habitat quality and help to identify specific habitat problems.

Overall habitat condition was classified as sub-optimal at most sites in the study area. Overall habitat quality was rated as optimal (>124) at 11 sites and sub-optimal (124-92) at 15 sites. Blacktail Creek, Silver Bow Creek at Rocker, and the Clark Fork River above the Little Blackfoot River (stations SF-1, 01, and 10, respectively) appeared to have the lowest overall habitat quality.

Substrate characteristics were considered sub-optimal at most sites upstream from Drummond. Relatively high cobble embeddness and excess sediment deposition was evident at all sites in the upper basin except Warm Springs Creek and the Little Blackfoot River (stations 6 and 10.2). Marginal riparian conditions and bank stability were identified as limiting habitat features in portions of Silver Bow Creek (stations 01 and 2.5) and the lower Deer Lodge Valley (station 10). All sites except Silver Bow Creek, Warm Springs Creek, and the Clark Fork River below Warm Springs Creek (station 07) had sub-optimal stream flows during August, 2000.

4.3 Community Composition and Structure

Macroinvertebrate assemblages continued to be more diverse and complex than in previous years. Taxa richness, EPT richness, and Shannon diversity were above average for all stream reaches (Table 4). Community density was above average in the upper Clark Fork River and most tributaries. Macroinvertebrates were more abundant in the Clark Fork River from the Warm Springs Ponds to Rock Creek (CFR0-2) than in downstream reaches (CFR3-6) or in tributaries.

Community composition was fairly uniform in most of the Clark Fork mainstem where caddisflies and dipterans comprised 62 to 90% of the benthic fauna. Hydropsychid caddisflies were numerically dominate throughout the river. *Hydropsyche occidentalis* was the most wide spread species and was numerically dominant at all mainstem sites from the Warm Springs Ponds to Harper Bridge (stations 04.5 through 20). *Cheumatopsyche* sp. was the most abundant macroinvertebrate in the Clark Fork River downstream from Superior (station 24).

More than 130 taxa were identified from the Clark Fork River during August, 2000. A total of 25 taxa attained relative abundances of five percent or more at stations along the river (Appendix B). These included 8 caddisflies, 3 mayflies, 2 beetles, 7 midges, 2 other dipterans, a snail, a scud, and an aquatic caterpillar.

Community composition was more varied among Clark Fork River tributaries. Macroinvertebrate assemblages in Silver Bow Creek above the Warm Springs Ponds (SBC) were dominated by pollution tolerant chironomids and were characterized by low diversity and taxa richness (Table 4). Mayflies, stoneflies, and most caddisflies were essentially absent from these sites. Silver Bow Creek below the Butte WWTP (station 01) supported a large population of *Simulium vittatum*. Other tributaries were characterized by high EPT richness and diversity. Tanytarsini midges were the most abundant macroinvertebrates in Warm Springs Creek, Rock Creek, and the Blackfoot River.

4.4 Community Biointegrity during 2000

The overall affect of water quality on macroinvertebrate assemblages was estimated from the composite score of 10 metrics (Table 2). For discussion purposes, bioassessment scores are categorized as nonimpaired (90 to 100%), slightly impaired (70 to 90%), moderately impaired (50 to 70%), or severely impaired (<50%).

Based on mean stream reach values, biological impairment was confined to the upper reaches of the study area (Figure 2). Silver Bow Creek above the Warm Springs Ponds (SBC) was severely impaired while the Clark Fork River from Deer Lodge to Rock Creek (CFR1 and CFR2) was slightly impaired. The Clark Fork River immediately below the Warm Springs Ponds (CFR0) and 4 downstream reaches were nonimpaired.

Benthic macroinvertebrate assemblages were relatively healthy throughout the Clark Fork River Basin in 2000 (Figure 3). Biointegrity scores were higher than the long-term average for all sites except the Clark Fork at Bonita (station 12). For all stations combined, biointegrity averaged 83% in 2000. From 1986 through 1998, annual mean biointegrity for the study area averaged 72% and ranged from 67 to 77%.

Biointegrity was nonimpaired at 15 of 27 monitoring sites in 2000. The majority of sites were classified as nonimpaired in both 1999 and 2000. Eight sites were slightly impaired while 3 stations were moderately impaired (Figure 4). Only 1 site was classified as severely impaired. Bioassessment scores (Table 5) ranged from 24% at Silver Bow Creek below the Colorado Tailings (station 01) to 95% in the Clark Fork River at Gold Creek Bridge (station 11). Upper Silver Bow Creek was moderately to severely impaired. Slight biological impairment was indicated in Silver Bow Creek below the Warm Springs Ponds (station 04.5) and in the Clark Fork River from Deer Lodge to the confluence of the Little Blackfoot River (stations 09, and 10). The Bearmouth to Bonita reach was slightly (station 11.7) to moderately (station 12) impaired. Biointegrity scores (83 to 88%) indicated slight impairment in the lower Bitterroot River and in the Clark Fork River below Missoula (station 18) and above the confluence of the Flathead River (station 25). All other Clark Fork River stations and tributaries were nonimpaired in 2000.

Nutrient/organic pollution was the principal cause of biological impairment in the most of the Clark Fork River Basin during 2000. Scores for the metrics most indicative of these pollutants ranged from 39 to 100% and indicated biological impairment at 12 stations (Table 5). Silver Bow Creek at Rocker (station 01) was severely impaired by the Butte sewage effluent. High macroinvertebrate densities and elevated numbers of filterers were indicative of slight nutrient/organic pollution in the remainder of Silver Bow Creek, the lower Bitterroot River, and at 5 Clark Fork River sites (stations 09, 10, 11.7, 18, and 25). The benthic community in the Clark Fork at Bonita (station 12) was characteristic of moderate impairment.

Metals pollution was evident at only 3 stations in 2000 (Figure 4). Moderate to severe metals pollution was indicated in upper Silver Bow Creek (stations 00, 01, and 02.5). Metals pollution was not indicated at any site downstream from the Warm Springs Ponds. This is the first year since monitoring began that significant metals pollution was not detected in the Clark Fork mainstem. Composite scores for metals-sensitive metrics ranged from 44 to 100% and averaged 85% for all stations combined (Table 5).

4.5 Long-term Monitoring

4.5.1 Clark Fork River

Long-term data (Tables 6-8) were evaluated for 17 Clark Fork River stations in seven stream reaches (Table 1). Silver Bow Creek below the Warm Springs Ponds (station 04.5) is included in the upper reach.

Biological integrity has improved in the uppermost reach of Clark Fork River in recent years. The Clark Fork River from the Warm Springs Ponds to Sager Lane (CFR0) was moderately impaired prior to 1992. This reach was slightly impaired from 1992 through 1998 and was considered nonimpaired in 1999 and 2000 (Table 6).

Temporal changes have been less evident in the remainder of the Clark Fork River. The reach from Deer Lodge to the confluence of the Little Blackfoot River (CFR1) has been characterized as moderately impaired on 8 dates and slightly impaired during 7 years. This reach is currently the most impaired reach of the Clark Fork River. On average, biological integrity has been slightly impaired in downstream reaches (CFR2 through 6). Biointegrity was slightly lower in the Clark Fork River from the confluence of the Bitterroot River to Alberton (CFR5) than in adjacent Clark Fork River reaches.

Based on long-term averages, most Clark Fork River stations were classified as slightly impaired (Figure 5). However, the Clark Fork at Deer Lodge (station 09) was, on average, moderately impaired (64%). The Clark Fork at Turah (station 13) has the highest average biointegrity (89%) among Clark Fork River stations and has been nonimpaired during 7 of the past 8 years. Other stations with relatively high mean biointegrity scores (>80%) are the Clark Fork River at Sager Lane (station 08.5), at Gold Creek (station 11), from Milltown Dam to the confluence of the Bitterroot River (stations 15.5 and 18), and from Superior to the confluence of the Flathead River

(stations 24 and 25). Biointegrity tended to be lower from Bearmouth to Bonita (stations 11.7 and 12) than at adjacent stations.

4.5.2 Clark Fork Basin Tributaries

Community-based assessments provide an overview of water quality at 12 stations on nine Clark Fork River tributaries. The period of record varies among sites (Table 1). The types and severity of pollutants varied substantially among streams (Figure 6). Blacktail Creek was slightly impaired by a combination of metals and nutrient-organic pollution. Silver Bow Creek above the Warm Springs Ponds (SBC) remains severely polluted by metals and varying degrees of nutrient/organic pollution. Silver Bow Creek below the ponds (station 04.5) was impaired by organic pollution and, prior to 2000, slight metals pollution. Warm Springs Creek (station 05) was frequently impaired by metals pollution from 1986 through 1993, but has been nonimpaired each of the past 5 years. Excellent water quality was indicated in the Little Blackfoot River, Rock Creek, and the Blackfoot River (stations 10.2, 12.5 and 14, respectively). In most years, Flint Creek (station 11.5) and the Bitterroot River (station 19) were slightly impaired by nutrient/organic pollution.

4.5.3 Nutrient and Organic Pollution

Nutrient and organic pollution are the principle causes of biological impairment in the Clark Fork River (Figure 5). Slight impacts from nutrient/organic pollution were routinely detected at the majority of sites within the Clark Fork mainstem, and in Silver Bow Creek, Flint Creek, and the lower Bitterroot River (Table 8).

Organic pollution was clearly indicated in Silver Bow Creek below the Butte WWTP (Table 8). Nutrients transported through Silver Bow Creek cause eutrophic conditions in the Warm Springs Ponds. Seston in the Warm Springs Ponds outflow has a significant impact on the trophic status of lower Silver Bow Creek and the upper few miles of the Clark Fork River (CFR0). The pond outflow also probably accounts for a substantial portion of the nutrient load to the remainder of the upper river.

Nutrient pollution has been indicated throughout the Clark Fork River. Impacts tend to be most pronounced in the upper river (CFR0, 1, and 2) and downstream from Missoula (CFR4). Nonpoint-source pollution appears to contribute to biological impairment in the lower Deer Lodge Valley (CFR1). Nutrients liberated from bank erosion and degraded riparian areas increase nutrient pollution. Low stream flows, high water temperatures, and excess

sediments tend to exasperate nutrient pollution in this reach. Nutrient pollution is also indicated in the lower Bitterroot River (station 19) and Flint Creek (station 11.5).

4.5.4 Metals Pollution

Metals-related impacts were routinely indicated in the upper Clark Fork River and several tributaries during the 1980s and early 1990s (Tables 9 and 10). Metals pollution was generally categorized as severe in upper Silver Bow Creek and slight at other affected sites/ (Table 8). While severe metals pollution continues in upper Silver Bow Creek, metals-related impairment has diminished in most of the basin. Since 1993, impacts attributable to metals pollution have usually been slight, and confined to portions of the Clark Fork River within the Deer Lodge Valley. However, in 1997, metals caused moderate biological impairment in the lower Deer Lodge Valley (CFR1) and slight metals-related impacts were indicated from the confluence of the Little Blackfoot to Turah (CFR2 and CFR3).

Biointegrity has improved over time at 6 sites in the upper Clark Fork River Basin (Table 6). There has been a significant reduction in metals pollution in Silver Bow Creek at the old Colorado Tailings site (station 00). However, metals impacts remain evident at this site (Table 8). Significant trends of increasing biointegrity were also evident in the Mill-Willow Bypass, Warm Springs Creek and at the first 3 sites below the Warm Springs Ponds (stations 04.5, 07, and 08). Metals pollution, as measured by the metals-sensitive metric subset, diminished over time at each of these sites (Tables 9 and 10).

These data reflect the effective treatment and containment of metals in the Warm Springs Ponds, and the removal or containment of sources in the Mill-Willow Bypass and Warm Springs Creek drainage. Slight impacts, consistent with metals contamination, continue in the lower Deer Lodge Valley (CFR1) and indicate additional metals sources in the Clark Fork floodplain. Recent metals-related impacts in the upper Clark Fork River appear to be the result of contaminated surface runoff and bank erosion caused by storm and high flow events.

4.6 Site-Specific Assessments

Blacktail Creek (station SF-1)

Blacktail Creek above Grove Gulch was rated as nonimpaired during 2000. This is the first time in 8 years of monitoring that this site has not been classified as impaired. Biointegrity was estimated at 91% despite an elevated metals tolerance index (5.1) and relatively low EPT richness (13). The stonefly, *Pteronarcella baddia*, was the most abundant macroinvertebrate in this years collection from Blacktail Creek.

Prior to 2000, Blacktail Creek was classified as slightly to moderately impaired (Figure 7). Biological integrity was depressed by the combined affects of poor habitat and water quality. Benthic habitat was limited due to sand scouring and embeddedness. Slight metals pollution was indicated each year from 1993 through 1999 while nutrient/organic pollution was indicated during 4 years. For the 8-year monitoring period, biointegrity scores have average 72% while the metals and nutrient/organic subsets have averaged 69 and 83%, respectively.

Silver Bow Creek above the Butte WWTP (station 00)

Silver Bow Creek above the Butte WWTP was classified as moderately impaired in 2000, marking the first time that this site was not classified as severely impaired. This site is in the new channel adjacent to the old Colorado Tailings area. The 2000 biointegrity estimate (55%) was substantially higher than the long-term average (30%) and the metals subset score (50%) was the highest recorded at this site during 14 years of monitoring (Figure 8). Although chironomids remain numerically dominant, caddisflies, stoneflies and mayflies have been present in low numbers each of the past four years. Mean taxa richness has increased by nearly threefold since 1996. Significant trends of improved biointegrity and decreased metals pollution are evident at this site (Tables 6 and 8).

Silver Bow Creek at Rocker (station 01)

Silver Bow Creek at Rocker was the most impaired site in the study and remains severely polluted (Figure 9). This site is downstream from the old Colorado Tailing and the Butte WWTP. Both the 2000 biointegrity estimate and the 15 year average were 24%. Severe metals and nutrient-organic pollution combine to make this site the most impaired in the study area. The benthic macroinvertebrate assemblage consisted of blackflies, midges, and tubificid oligochaetes.

Silver Bow Creek at Opportunity (station 02.5)

Silver Bow Creek at Opportunity was moderately impaired by metals pollution in 2000. Biointegrity was estimated at 52% with a metals subset score of 44%. Slight nutrient/organic pollution was also indicated (67%).

Data from stations 03 (discontinued after 1992) and 02.5 were used to evaluate temporal trends in this portion of Silver Bow Creek (Figure 10). This reach has been classified as severely impaired each year except 1994, 1996, and 2000. Biointegrity has averaged 45% during the past 15 years.

Silver Bow Creek below the Warm Springs Ponds (station 04.5)

Water quality continues to improve in Silver Bow Creek below the Warm Springs Ponds. The 2000 biointegrity estimate (88%) and the metals subset score (89%) were the highest recorded at this site during 15 years of monitoring. Biological integrity was classified as slightly impaired by nutrient/organic pollution during 2000. This is the first year that significant metals pollution has not been indicated. Taxa richness, EPT richness, and diversity continued to increase while the metals tolerance index was at an all-time low (4.5) for this site (Appendix D-5).

Prior to 1993, Silver Bow Creek below the Warm Springs Ponds was severely impaired by metals, nutrient and organic pollution. However, metals pollution has been reduced in recent years and biointegrity has improved significantly (Figure 11). Organic loading from the pond outflow appears to be the principal factor limiting biological integrity at this site.

Mill-Willow Creeks Bypass (station MW-2)

Sampling was resumed at this site in 1999 after a 6 year hiatus. From 1986 through 1992, metals impacts were evident and the stream was moderately impaired (Figure 12). The Mill-Willow Bypass has been classified as nonimpaired each of the past 2 years. The biointegrity estimate for 2000 was 94%.

In 2000, the Mill-Willow bypass supported a diverse macroinvertebrate assemblage. The fauna was dominated by the caddisfly, *Helicopsyche borealis*, and the beetle, *Optioservus* spp, taxa that are characteristic of a predominantly sand substrate. The metals tolerance index declined from an average of 5.6 prior to 1992 to 4.1 during the last two years (Appendix C-6).

Warm Springs Creek (station 06)

Biological integrity was estimated at 94% in Warm Springs Creek during 1999 and has been classified as nonimpaired each year since 1996. Metals pollution was indicated during most years prior to 1996 and resulted in moderate impairment in 1986 and 1987 (Figure 13). Nutrient/organic pollution has not been detected in Warm Springs Creek. Low stream flow precluded quantitative sampling in 1992.

Clark Fork River below Warm Springs Creek (station 07)

Biointegrity has improved dramatically at the uppermost station on the Clark Fork River (Figure 14) and was nonimpaired (92%) in 2000. Metals pollution has diminished (Table 8) while biological integrity has increased (Table 6) since reclamation and restoration activities in the Warm Springs Ponds, Mill-Willow Bypass, and Warm Springs Creek were completed in 1993. From 1986 through 1992, this site was moderately impaired and had the lowest biointegrity (60%) in the Clark Fork River. Biointegrity was slightly impaired from 1993 through 1996, but was classified as nonimpaired in 1997, 1999, and 2000. Metals pollution was detected at this site on all dates prior to 1993, but has been indicated only once (1995) in the past 8 years.

Clark Fork River near Dempsey (station 08)

Biointegrity was estimated at 89% in the Clark Fork River at Dempsey in 2000. Neither metals nor nutrient pollution were indicated. Water quality has improved significantly at this site in recent years (Figure 15). Moderately to slight impairment due to metals and nutrient pollution was indicated from 1986 through 1992. During that time, biointegrity averaged 74% and the mean scores for the metals and nutrient/organic subsets were 74% and 80%, respectively. This site was not sampled again until 1998 when it was classified as slightly impaired due to nutrient/organic pollution. Metals pollution has not been indicated since monitoring was resumed in 1998.

Clark Fork River at Sager Lane (station 08.5)

The Clark Fork River at Sager Lane was sampled from 1990 to 1992 and from 1998 and 2000. Biological integrity has been relatively high at this site on each date. Biointegrity has ranged from 88 to 91% and significant impairment has not been evident (Figure 16).

Clark Fork River at Deer Lodge (station 09)

The Clark Fork River at Deer Lodge was slightly impaired (79%) by nutrient/organic pollution (61%) in 2000. Significant metals pollution was not indicated (83%). This site has been moderately impaired during 10 of the last 14 years and had the lowest average biointegrity (64%) in the Clark Fork River over the past 7 years. Slight metals pollution has been indicated during 12 of the past 15 years; however, nutrient/organic pollution generally appeared to have a greater impact on biointegrity (Figure 17). The nutrient/organic subset score has exhibited a slight, but statistically significant, negative temporal trend (Table 7).

Clark Fork River above Little Blackfoot River (station 10)

Biological integrity in the Clark Fork River above the Little Blackfoot was slightly impaired (82%) in 2000. Nutrient/organic pollution (67%) was indicated but metals pollution (89%) was not.

This site has been impaired during all 15 years of monitoring. The 2000 assessment scores were substantially higher than the 15-year average (biointegrity 70%; metals subset 76%; nutrient/organic subset 64%). Metals and nutrient/organic pollution were routinely detected (Figure 18). Nutrient/organic pollution, accentuated by low stream flow and excess sediment deposition, was generally the most significant cause of impairment. However, slight metals pollution was indicated during 11 years and moderate impacts attributable to metals were indicated during 1997. The 1997 biointegrity estimate (48%) and the metals subset score (44%) were the lowest recorded at any Clark Fork River site since monitoring began (Tables 6 and 8).

Little Blackfoot River (station 10.2)

Biological integrity was nonimpaired (94%) in the Little Blackfoot River during 2000. Mean biointegrity during the past 7 years has been 92% and indicates excellent water quality. No trends in biointegrity were evident (Figure 19).

Clark Fork River at Gold Creek Bridge (station 11)

Biological integrity was classified as nonimpaired (95%) at the Gold Creek Bridge site in 2000. This site has been classified as impaired during 12 of the last 15 years (Figure 20). The Clark Fork at the Gold Creek Bridge appears susceptible to excessive sand deposition, and slight reductions in

biointegrity scores may reflect unstable habitat conditions (McGuire 1989b). With regard to water quality, this is usually one of the healthiest sites on the upper Clark Fork River. Since 1986, biointegrity has averaged 84% while the mean metals and nutrient/organic subset scores have been 83 and 78%, respectively. Nutrient/organic pollution was indicated on 7 dates. Metals pollution has been indicated on 5 dates, but only once during the past 8 years (1997).

Flint Creek (station 11.5)

Biointegrity in Flint Creek was estimated at 92% and considered nonimpaired in 2000. During the past eight years, Flint Creek has been classified as nonimpaired 3 times and slightly impaired 5 times. Nonpoint source nutrient and sediment pollution have generally been indicated (Figure 21). Metals pollution has not been indicated. The relatively low metals metric subset score in 1999 was apparently due to recent construction at the upstream bridge and poor sampling conditions during a storm surge (McGuire 2000).

Clark Fork River at Bearmouth (station 11.7)

The Clark Fork River at Bearmouth has been monitored since 1993 and was slightly impaired (79%) in 2000. Nutrient pollution was clearly indicated during 5 years, including 2000 (Figure 22). Metals pollution was indicated at this site only once (1997) during the 8-year monitoring period.

Clark Fork River at Bonita (station 12)

The Bonita site was moderately impaired and had the lowest score among all Clark Fork River sites in 2000. Biointegrity was estimated at 68% which is near the long-term average of 71%. Slight to moderate nutrient/organic pollution has been indicated during 13 of the past 15 years (Figure 23). Slight metals pollution was indicated 6 times between 1986 and 1992, but has been indicated only once (1997) since 1992.

Rock Creek near Clinton (station 12.5)

Biological integrity was nonimpaired in Rock Creek on all 8 dates sampled (Figure 24). Biointegrity scores have averaged 93% and consistently indicated excellent water quality. The 2000 biointegrity estimate was 93%.

Clark Fork River at Turah (station 13)

Biointegrity was nonimpaired (94%) at Turah for the third straight year. This site has the highest average biointegrity in the Clark Fork River (89%) and is among the healthiest stations in the study area. Biological integrity has been nonimpaired each year since 1992 except 1997 (Figure 25). Slight metals pollution was indicated at this site in 1986, 1990, and 1997 while nutrient and organic pollution was indicated in 1987, 1988, 1990 and 1992.

Blackfoot River near mouth (station 14)

The lower Blackfoot River continued to be among the healthiest sites in the study area and was nonimpaired in 2000. Biointegrity was estimated at 92%. Biointegrity has averaged 90% at this site over the past 15 years (Figure 26). Slight impairment was detected from 1986 through 1989 and was attributed to reduced sediment transport and higher temperatures during a drought. High flows during 1997 also resulted in a slightly lower biointegrity score (83%).

Clark Fork River above Missoula (station 15.5)

This site, located approximately 1.5 miles below Milltown Dam, was nonimpaired in 2000. Biointegrity (91%) was well above the long-term site average (82%). Slight to moderate nutrient-organic pollution was usually evident at this site (Figure 27). Metals pollution has not been indicated since 1990.

Clark Fork River at Shuffield's (station 18)

The Clark Fork at Shuffield's was slightly impaired (88%) by nutrient pollution in 2000. Biointegrity was near the 15-year average (86%). Slight nutrient/organic pollution was frequently indicated at this site (Figure 28) which is approximately two miles below the Missoula WWTP discharge. Metals pollution has not been clearly indicated at this site since monitoring began in 1986; however, both the 1997 and 1998 assessments were borderline (78%).

Bitterroot River near mouth (station 19)

Biointegrity was estimated at 86%, and considered slightly impaired by nutrient/organic pollution, in the lower Bitterroot River during 2000. Biointegrity has averaged 85% since 1986. Nutrient/organic pollution has been indicated during 10 of the past 15 years (Figure 29). Metals pollution has not been indicated at this site.

Clark Fork River at Harper Bridge (station 20)

The Clark Fork at Harper Bridge was classified as nonimpaired in 2000. Biological integrity was estimated at 95%. This site has the lowest long-term mean biointegrity (77%) among stations from Missoula to the Flathead River. Nutrient/organic pollution has been indicated at Harper Bridge on all dates prior to 1999 (Figure 30). Impacts have generally been slight, although moderate impacts were indicated in 1988 and 1993 (Figure 30). Impacts appear to result from the assimilation of nutrients from the Missoula WWTP and the Bitterroot River.

Clark Fork River at Huson (station 22)

The Clark Fork River at Huson was not sampled in 2000 due to access and fire restrictions. Biointegrity has been slightly to moderately impaired on all dates since monitoring began in 1986. The long-term average for this site is 78%. Nutrient/organic pollution was not indicated in 1999 but was evident on all other dates (Figure 31). Biointegrity was moderately impaired in 1986, 1988, and 1994 and slightly impaired on all other dates.

Clark Fork River near Superior (station 24)

Biointegrity was nonimpaired (92%) in the Clark Fork River near Superior in 2000. Biointegrity has averaged 83% during the past 15 years with slight nutrient/organic pollution indicated on 10 dates (Figure 32). Metals pollution has not been indicated at this site.

Clark Fork River above the Flathead River (station 25)

The Clark Fork River above the confluence of the Flathead River was slightly impaired (86%) in 2000. Since 1986, biointegrity has averaged 83% at this site. Slight nutrient/organic pollution was indicated during most years, including 2000 (Figure 33). The underside of cobbles are being recolonized by sponge (Porifera) after extensive scouring in 1997.

Clark Fork River above Thompson Falls Reservoir (station 27)

The Clark Fork River above Thompson Falls is unique among monitoring sites in this study. The sampling technique and analyses used to evaluate the rest of the study area are only marginally suited to this site. The large river habitat, high discharge, and unique benthic community in this reach bias the biointegrity assessment. Nevertheless, the data can be used to monitor trends at this site.

The biointegrity score for the Clark Fork above Thompson Falls Reservoir was 78% during 2000. Biointegrity scores have averaged 72% at this site since 1987 (Figure 34). Community density, taxa richness and EPT richness were slightly below average.

Table 3. Annual peak flows and mean August streamflows at selected USGS gaging stations in the Clark Fork River Basin (cubic feet per second).

Peak discharge

Annual peak year	Silver Bow Creek blw Blacktail Cr. USGS # 12323250	Clark Fork River at Deer Lodge USGS # 12324200	Clark Fork River below Missoula USGS # 12353000	Clark Fork River near Plains USGS # 12389000
1986	253	2090	32300	76800
1987	270	463	15800	35800
1988	224	409	14300	29200
1989	152	1430	26300	58800
1990	320	507	22200	65900
1991	216	1020	27200	74100
1992	232	367	12400	30100
1993	165	613	23400	50500
1994	159	462	16900	31600
1995	320	1240	25500	73700
1996	272	1400	38200	90300
1997	276	2020	55100	110000
1998	447	1090	21000	58900
1999	204	819	31300	63000
2000	74	263	13500	42600
mean	239	946	25027	59420

Mean August discharge

August mean year	Silver Bow Creek blw Blacktail Cr. USGS # 12323250	Clark Fork River at Deer Lodge USGS # 12324200	Clark Fork River below Missoula USGS # 12353000	Clark Fork River near Plains USGS # 12389000
1986	19.5	55.7	1812	7612
1987	27.7	88.5	1473	9813
1988	18.7	27.8	997	5656
1989	22.0	81.7	2464	14750
1990	25.8	84.3	2554	10510
1991	16.4	30.1	1997	10350
1992	14.2	40.1	1280	9738
1993	28.7	312	3696	11770
1994	16.1	36.3	1295	5891
1995	21.8	107	2561	10360
1996	18.7	95.2	2766	16530
1997	27.5	337	3620	17700
1998	24.6	117	2890	13700
1999	22.4	93	2625	13400
2000	14.5	34.5	1145	9010
mean	21.2	103	2212	11119

high and low flows in bold

Table 4. Mean metric values characterizing macroinvertebrate assemblages in eight Clark Fork River Basin stream reaches during August, 1986 through 2000 (ranges in parentheses).

metric	SBC		CFR0		CFR1		CFR2		CFR3		CFR4		CFR5		CFR6		TRIBS	
	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)	1986-1999 (range)	2000 (range)
Density	506 (88-1103)	625 (896-2956)	1969 (327-3249)	2327 (392-4238)	1924 (226-5635)	2949 (492-2041)	1610 (198-3733)	2560 (393-2418)	1753 (409-1120)	1454 (198-3733)	1047 (393-2418)	1838 (409-1120)	1602 (393-2418)	999 (409-1120)	1003 (393-2418)	992 (409-1120)	696 (393-2418)	1096 (409-1120)
Taxa richness	10 (7-14)	17 (20-39)	29 (22-35)	42 (24-40)	28 (26-50)	40 (28-45)	33 (26-40)	40 (25-42)	39 (28-45)	41 (26-40)	36 (26-40)	43 (25-42)	32 (33-38)	44 (33-38)	33 (33-38)	38 (33-38)	36 (33-38)	40 (33-38)
EPT richness	2 (1-4)	3 (8-18)	13 (10-18)	20 (13-22)	14 (16-26)	19 (16-25)	17 (16-20)	21 (14-23)	21 (16-25)	22 (16-20)	20 (14-23)	23 (18-21)	17 (18-21)	22 (18-21)	19 (18-21)	23 (18-21)	20 (18-21)	21 (18-21)
S. Diversity	1.8 (1.5-2.1)	2.0 (2.1-3.8)	2.9 (1.9-3.9)	3.6 (2.7-3.8)	2.7 (3.1-4.4)	3.4 (3.1-4.4)	3.1 (2.9-4.0)	3.1 (2.2-4.1)	3.7 (2.9-4.0)	3.7 (2.2-4.1)	3.7 (2.6-3.8)	3.4 (3.3-4.1)	3.7 (3.3-4.1)	3.1 (3.3-4.1)	4.0 (3.3-4.1)	3.4 (3.3-4.1)	3.4 (3.3-4.1)	3.7 (3.3-4.1)
EPT/EPTC	0.18 (.04-.32)	0.23 (.69-.97)	0.84 (.69-.97)	0.79 (.68-.95)	0.86 (.74-.92)	0.82 (.61-.92)	0.83 (.62-.91)	0.88 (.62-.91)	0.74 (.62-.91)	0.79 (.62-.91)	0.81 (.62-.91)	0.69 (.52-.94)	0.77 (.60-.86)	0.58 (.51-.81)	0.74 (.60-.86)	0.69 (.51-.81)	0.67 (.51-.81)	0.55 (.51-.81)
Baetidae/ Ephemeroptera	0.96 (.67-1.00)	1.00 (.19-.98)	0.74 (.41-1.00)	0.70 (.24-.96)	0.78 (.22-.87)	0.52 (.34-.90)	0.68 (.24-.90)	0.66 (.24-.90)	0.51 (.24-.90)	0.25 (.19-.69)	0.51 (.40-.65)	0.25 (.19-.69)	0.62 (.40-.65)	0.56 (.19-.69)	0.62 (.40-.65)	0.62 (.19-.69)	0.19 (.40-.65)	0.51 (.19-.69)
Hydropsychinae/ Trichoptera	0.91 (.72-1.00)	0.65 (.65-.99)	0.88 (.57-1.00)	0.78 (.53-.96)	0.88 (.54-.96)	0.93 (.47-.95)	0.82 (.47-.95)	0.86 (.47-.95)	0.81 (.47-.95)	0.84 (.47-.95)	0.87 (.47-.95)	0.87 (.45-.98)	0.86 (.72-.97)	0.81 (.72-.97)	0.88 (.72-.97)	0.86 (.72-.97)	0.51 (.31-.72)	0.61 (.31-.72)
% Filterer	35 (7-55)	50 (29-72)	53 (35-81)	40 (26-72)	65 (22-68)	60 (36-75)	55 (33-74)	63 (52-86)	47 (31-53)	57 (52-86)	58 (31-53)	52 (31-53)	61 (31-53)	34 (31-53)	63 (31-53)	66 (31-53)	42 (31-53)	36 (31-53)
Biotic index	5.5 (5.1-6.1)	5.6 (4.7-5.3)	5.0 (4.8-5.4)	4.9 (4.5-5.6)	5.0 (3.8-5.1)	4.9 (4.2-5.2)	4.8 (3.6-5.3)	4.5 (4.2-5.0)	4.5 (4.2-5.0)	4.2 (4.2-5.0)	4.5 (4.2-5.0)	4.8 (4.2-5.0)	4.7 (4.2-5.0)	4.9 (4.2-5.0)	4.7 (4.2-5.0)	4.6 (4.2-5.0)	4.6 (4.2-5.0)	4.2 (4.2-5.0)
Metals index	8.2 (7.6-8.9)	7.3 (4.6-5.8)	5.1 (4.7-5.6)	4.6 (4.4-5.3)	5.2 (3.5-5.3)	4.9 (4.0-5.7)	4.9 (3.5-5.3)	4.5 (3.5-5.3)	4.5 (3.5-5.3)	4.5 (3.5-5.3)	4.2 (3.5-5.3)	4.5 (3.5-5.3)	4.5 (3.5-5.3)	4.4 (3.5-5.3)	4.4 (3.5-5.3)	4.1 (3.5-5.3)	3.5 (3.4-4.1)	3.8 (3.4-4.1)

Stream reaches: SBC = stations 00, 01, 02; CFR0 = 04, 05, 07, 08, 08.5; CFR1 = 09, 10; CFR2 = 11, 11.7, 12; CFR3 = 13; CFR4 = 15.5, 18; CFR5 = 20, 22; CFR6 = 24, 25; TRIBS = 06, 10.2, 11.5, 12.5, 14, 19. 2000 values in bold were outside established ranges.

Table 5. Macroinvertebrate community biointegrity estimates for Clark Fork River Basin stations during August, 2000.

Station	% Biointegrity		
	overall	metals subset	organic subset
SF-1	91	72	100
Silver Bow Creek			
00	55 **	50 **	78 *
01	24 ***	44 **	39 ***
02.5	52 **	44 **	67 *
Clark Fork River			
04.5	88 *	89	72 *
07	92	89	83
08	89	89	89
08.5	91	89	78
09	79 *	83	61 *
10	82 *	89	67 *
11	95	94	89
11.7	79 *	94	50 *
12	68 **	89	39 **
13	94	94	83
15.5	91	94	89
18	88 *	94	67 *
20	95	94	89
22			
24	92	100	83
25	86 *	100	61 *
27	78 *	67 *	83
Tributaries			
MW-2	94	89	89
06	94	94	94
10.2	94	94	94
11.5	92	89	94
12.5	93	89	100
14	92	100	94
19	86 *	94	67 *
Reach means			
SBC	44 ***	46 **	61 *
CFR0	90	89	81
CFR1	81 *	86	64 *
CFR2	81 *	92	59 *
CFR3	94	94	83
CFR4	90	94	78
CFR5	95	94	89
CFR6	89 *	100	72 *
Tributaries	92	93	90
ALL	83 *	85	78 *

Classification : slightly impaired *, moderately impaired **, severely impaired ***.

Table 6. Mean macroinvertebrate biointegrity (%) and Spearman rank correlation coefficients (rs) for Clark Fork River Basin monitoring stations - August, 1986-2000.

station	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean	S.D.	rs	P value	
SF-1																				
Silver Bow Creek	18	32	15	22	35	17	22	35	27	30	47	33	41	55	31	12	.77	.000		
0.0	1	38	17	32	13	26	25	20	21	25	18	23	33	24	24	7	.06	.64		
0.1																				
02.5	38	40	35	50	43	43	47	55	43	50	38	45	50	52	45	6	.38	.003		
Clark Fork River																				
04.5	45	44	44	47	41	45	71	70	59	62	58	61	83	88	58	15	.79	.000		
07	59	64	53	59	55	65	65	83	82	88	77	94	86	94	92	74	15	.85	.000	
08	71	65	71	65	85	73	88						85	91	89	78	10	.73	.000	
08.5																				
09	52	65	62	73	61	83	55	86	53	58	55	55	55	68	79	64	11	-.01	.97	
10	52	68	71	80	79	86	68	87	59	74	65	48	59	77	82	70	12	.04	.75	
11	86	80	85	88	63	89	85	92	94	86	78	62	86	88	95	84	10	.16	.23	
11.7																				
12	64	80	58	76	61	64	56	89	76	74	70	57	76	97	68	71	12	.18	.17	
13	88	80	76	88	86	92	83	95	89	94	94	82	91	98	94	89	6	.44	.000	
15.5	76	88	86	77	68	79	80	90	82	83	85	71	82	95	91	82	7	.33	.02	
18	73	88	91	80	86	91	83	95	80	94	86	78	79	95	88	86	7	.14	.30	
20	71	77	61	79	73	79	76	61	79	82	76	83	76	92	95	77	9	.52	.000	
22	62	86	68	89	88	71	74	85	68	79	75	78	82	88	78	78	9	.19	.15	
24	90	79	76	73	88	85	92	91	74	89	73	71	79	92	92	83	8	.01	.92	
25	83	85	82	76	80	83	88	80	82	98	77	73	88	86	88	83	6	.21	.10	
27	65	68	64	67	72	67	67	78	72	77	75	73	85	78	72	72	6	.57	.000	
Tributaries																				
MW-2	58	61	67	61	43										97	94	69	20	.52	.002
0.6	67	78	80	82	78	91		77	91	75	90	90	92	95	94	84	9	.67	.000	
10.2										90	94	97	92	88	88	95	94	92	3	-.05
11.5										77	83	92	85	88	91	93	92	86	5	.27
12.5										91	93	93	95	90	98	92	93	93	2	.18
14	82	83	90	85	92	88	89	90	95	97	92	83	95	92	92	90	5	.54	.000	
19	79	83	82	91	85	86	79	90	73	98	85	87	92	93	86	86	6	.27	.04	
Reach means																				
SBC	25	33	26	30	34	27		30	37	32	36	34	34	41	44	33	5	.35	.02	
CFR0	58	58	56	57	67	68	81	77	76	74	70	76	81	89	90	72	11	.65	.000	
CFR1	52	67	67	77	70	85	62	87	56	66	60	52	57	73	81	67	11	.03	.90	
CFR2	75	80	72	82	62	77	71	92	79	78	73	58	82	93	81	77	9	.15	.38	
CFR3	88	80	76	88	86	92	83	95	89	94	94	82	91	98	94	89	6	.62	.015	
CFR4	75	88	89	79	77	85	82	93	81	89	86	75	81	95	90	84	6	.26	.17	
CFR5	67	82	65	84	81	75	75	73	74	81	76	81	79	90	95	78	8	.40	.03	
CFR6	87	82	79	75	84	84	90	86	78	94	75	72	84	90	89	83	6	.13	.50	
TRBs																				
All stations	67	68	67	69	69	72	70	77	74	77	73	69	76	84	83	73	6	.83	.000	

* Stream reaches: SBC = stations 00, 01 & 02.5; CF0 = stations 04.5, 07, 08, 08.5; CF1 = stations 09 & 10; CF2 = stations 11, 11.7, & 12; CF3 = station 13; CF4 = stations 15.5 & 18; CF5 = stations 20 & 22; CF6 = stations 24 & 25; TRbs = stations 06, 10.2, 11.5, 12.5, 14 & 19.

Table 7. Macroinvertebrate biointegrity (%) as measured by metrics* sensitive to organic pollution and Spearman rank correlation coefficients (r_s) for Clark Fork River Basin stations - August, 1986-2000.

station	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean	S.D.	r_s	P value
SF-1																			
Silver Bow Creek																			
00	83	83	58	75	83	67	83	83	75	75	92	78	78	78	78	.09	.50		
01	67	67	17	50	58	42	28	33	67	61	58	39	67	39	51	17	-.07	.59	
02.5	83	83	33	100	83	75	42	92	61	92	92	92	100	67	78	20	.20	.13	
Clark Fork River																			
04.5	50	56	44	39	56	83	72	56	50	33	33	78	72	54	16	.29	.03		
07	72	72	50	78	56	72	83	83	83	67	89	67	89	83	75	12	.46	.000	
08	78	78	67	89	83	89						72	89	89	81	8	.44	.01	
08.5																			
09	56	67	50	61	44	83	50	89	50	39	50	44	44	44	56	14	-.25	.05	
10	39	61	56	83	67	89	67	83	50	67	50	58	56	61	64	14	-.06	.66	
11	89	72	92	89	42	89	78	94	89	83	67	42	78	83	83	50	66	18	-.09
11.7																			
12	72	83	33	67	61	50	44	89	89	72	67	72	58	72	94	39	65	18	-.02
13	89	67	44	89	83	83	67	92	89	89	83	92	89	94	83	82	13	.34	.01
15.5	72	75	81	58	42	78	83	100	78	67	72	61	67	67	100	89	75	15	.26
18	67	89	94	78	72	89	61	89	61	89	67	50	78	89	67	76	14	-.21	.11
20	67	67	39	78	67	72	61	33	67	67	61	67	61	92	89	66	15	.25	.05
22	61	78	50	89	92	61	61	78	33	67	67	100	75	92	72	18	.34	.01	
24	83	72	61	61	78	83	89	89	61	78	61	61	83	83	74	11	-.11	.41	
25	92	83	72	72	83	83	61	72	94	56	56	78	75	61	74	12	-.27	.04	
27																			
Tributaries																			
MW-2	58	61	78	56	42														
06	100	92	75	94	83	94													
10.2																			
11.5																			
12.5																			
14	100	83	83	100	100	100	94	92	92	100	100	100	100	100	94	93	9	.02	.86
19	72	72	72	83	72	78	67	92	56	94	72	67	83	100	67	76	12	.09	.48
Reach means																			
SBG	78	61	58	69	72	50	68	59	78	70	81	69	82	61	68	9	.08	.61	
CFR0	67	69	57	61	68	75	85	83	78	70	59	61	65	85	81	71	10	.29	.05
CFR1	48	64	53	72	56	86	59	86	50	59	45	54	50	53	64	60	13	-.14	.47
CFR2	81	78	63	78	52	70	61	91	70	69	47	78	87	59	70	12	-.09	.60	
CFR3	89	67	44	89	83	83	67	92	89	89	83	92	89	94	83	82	13	.44	.100
CFR4	70	82	88	68	57	84	72	95	70	78	70	56	73	95	78	75	12	.02	.94
CFR5	64	73	45	84	80	67	61	56	50	67	64	84	68	92	89	93	9	.26	.17
CFR6	88	78	67	67	75	83	86	75	67	86	59	70	79	72	74	9	-.23	.22	
TRIBS																			
All stations	73	63	72	68	76	69	80	71	78	70	75	75	86	78	73	6	.41	.13	

* metric subset: biotic index, % filterers and community density

Table 8. Macroinvertebrate biointegrity (%) as measured by metrics' sensitive to metals pollution and Spearman rank correlation coefficients (r_s) for Clark Fork River Basin stations - August, 1986-2000.

station	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean	S.D.	r_s	P value	
SF-1																				
Silver Bow Creek	0	0	11	22	17	11	11	39	17	33	39	28	44	50	23	16	.83	.000		
0.0	39	6	44	33	44	33	28	44	44	28	39	17	44	50	36	12	.19	.14		
0.1	22	17	44	28	22	28	50	33	56	22	44	22	28	22	32	12	.08	.56		
Clark Fork River	04.5	61	61	67	67	61	72	72	61	72	72	72	78	89	69	8	.79	.000		
0.7	72	72	78	72	72	72	72	83	78	83	89	94	89	89	80	8	.84	.000		
0.8	78	72	72	72	72	67	83	83	83	83	83	83	89	89	78	8	.69	.000		
08.5	78	78	72	83	72	83	72	78	72	72	78	67	78	83	84	2	.74	.000		
0.9	78	78	72	83	72	83	72	78	72	72	78	67	78	83	76	5	.14	.30		
1.0	72	78	72	67	78	83	78	78	78	78	83	44	78	78	76	10	.32	.01		
1.1	83	78	78	89	67	83	78	89	94	83	83	67	89	83	83	8	.32	.01		
11.7																				
12	78	83	78	78	72	78	78	78	83	83	83	83	83	83	81	8	.34	.01		
13	78	89	94	83	78	89	94	94	89	89	94	94	94	94	88	10	.37	.004		
15.5	83	92	92	72	78	83	83	83	89	94	94	94	94	94	87	7	.44	.001		
18	83	89	89	83	89	89	94	94	94	89	94	94	94	94	89	6	.13	.32		
20	83	83	78	78	78	83	83	83	89	89	89	78	94	94	84	5	.29	.03		
22	83	89	83	89	78	83	83	83	83	83	83	78	83	83	83	3	-.47	.000		
24	89	83	89	83	94	83	94	94	83	94	83	94	94	100	89	6	.05	.69		
25	67	89	94	83	89	83	89	94	94	100	94	89	83	100	89	8	.43	.001		
27															70	9	-.38	.005		
Tributaries																				
MW-2	61	72	67	72	50										94	89	72	15	.54	.003
0.6	50	56	67	72	67	83									75	13	.79	.000		
10.2															90	8	.06	.75		
11.5															87	8	.09	.61		
12.5															88	5	-.16	.38		
14	61	83	83	67	83	72	100	83	94	94	83	78	94	100	84	11	.45	.000		
19	83	89	89	94	83	89	89	89	78	83	100	89	83	94	88	.6	.01	.96		
Reach means																				
SBC	8	29	24	29	26	30	29	46	22	39	26	33	39	46	29	10	.42	.006		
CFF0	70	68	70	70	74	71	79	78	70	78	81	83	85	89	74	6	.67	.000		
CFF1	75	78	72	75	75	83	75	78	75	81	56	78	86	75	7	.22	.25			
CFF2	81	81	78	84	70	81	78	87	89	83	67	89	90	92	81	7	.48	.002		
CFF3	78	89	94	83	78	89	94	94	89	94	61	94	100	94	87	10	.46	.08		
CFF4	83	91	91	78	84	86	89	92	92	94	81	86	92	94	87	5	.37	.05		
CFF5	83	86	81	84	78	83	83	86	84	81	89	81	94	83	4	.14	.47			
CFF6	78	86	92	83	92	83	92	94	89	97	86	92	89	100	88	6	.40	.03		
TRIBs															86	4	.20	.16		
All stations	70	70	73	70	71	72	76	77	80	76	79	68	80	85	74	5	.69	.004		

* metric subset: metals tolerance index, EPT richness and community density.

Table 9. Percentage of site assessments indicating significant biological impairment from metals in the Upper Clark Fork River Basin during 3 time periods (1986-2000).

Reach	percentage of metals subset scores < 80%		
	1986-1991	1992-1997	1998-2000
Upper Silver Bow Creek	100	100	100
Mill-Willow Bypass	100	no data	0
Warm Springs Creek	83	33	0
Clark Fork River reaches			
CFR0	90	54	17
CFR1	75	92	67
CFR2	67	29	0
CFR3	33	17	0

Table 10. Mean EPT richness and metals tolerance index values in the Upper Clark Fork River Basin during 3 time periods (1986-2000).

10a. Number of mayfly, stonefly and caddisfly taxa per Hess sample

Reach	EPT richness		
	1986-1991	1992-1997	1998-2000
Upper Silver Bow Creek	2	2	3
Mill-Willow Bypass	9	no data	21
Warm Springs Creek	12	15	21
Clark Fork River reaches			
CFR0	9	14	18
CFR1	13	14	17
CFR2	16	18	21
CFR3	20	23	23

10b. Mean community metals tolerance

Reach	MTI value		
	1986-1991	1992-1997	1998-2000
Upper Silver Bow Creek	8.3	8.6	7.7
Mill-Willow Bypass	5.6	no data	4.1
Warm Springs Creek	4.9	4.2	3.8
Clark Fork River reaches			
CFR0	5.2	5.1	4.7
CFR1	5.1	5.2	5.1
CFR2	5.0	4.8	4.6
CFR3	4.9	4.3	4.1

Figure 2. Mean aquatic macroinvertebrate community biointegrity in Clark Fork River Basin stream reaches and tributaries during August, 2000.

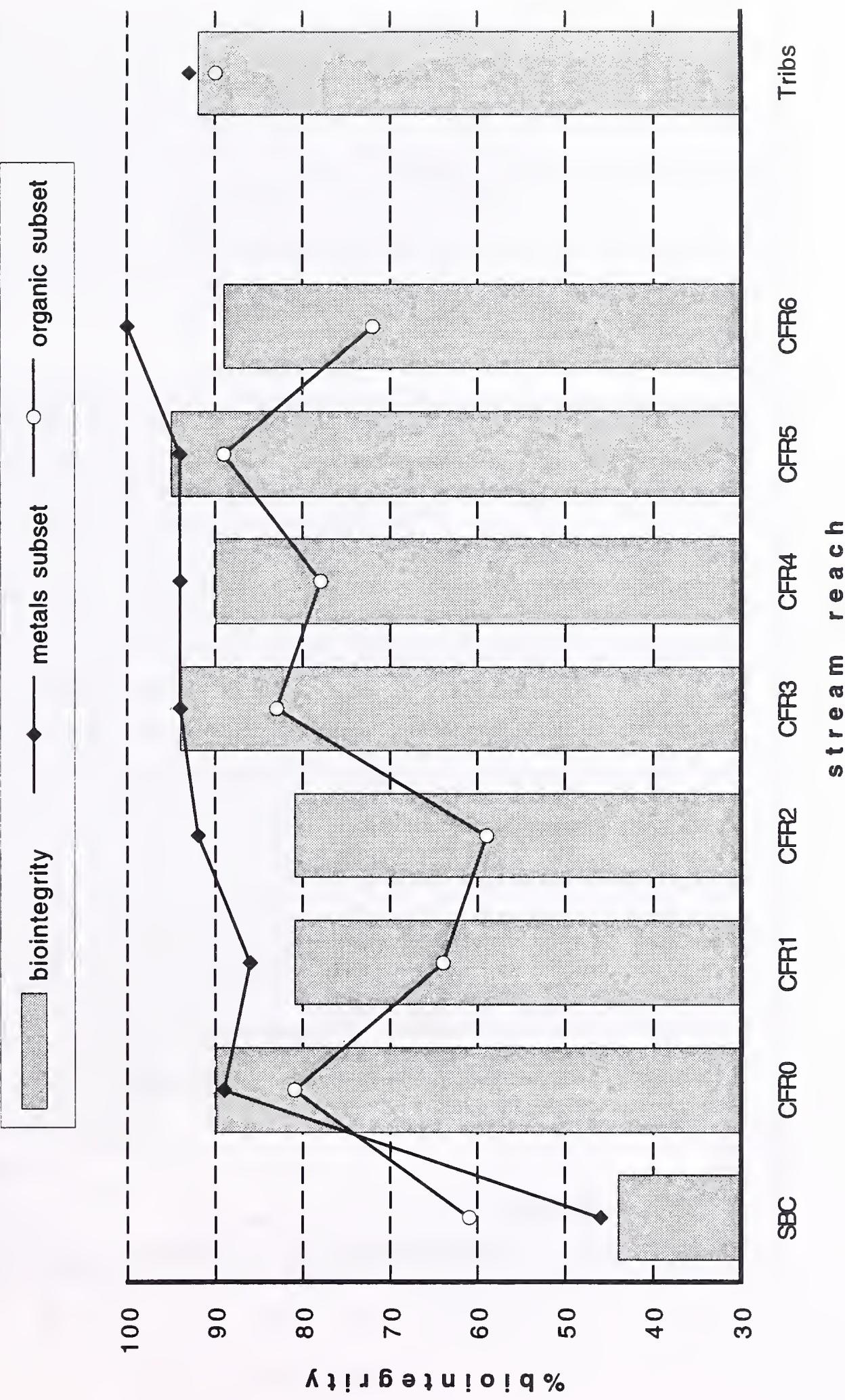


Figure 3. Long-term aquatic macroinvertebrate community biointegrity at 28 stations in the Clark Fork River Basin during August (1986-1999 and 2000).

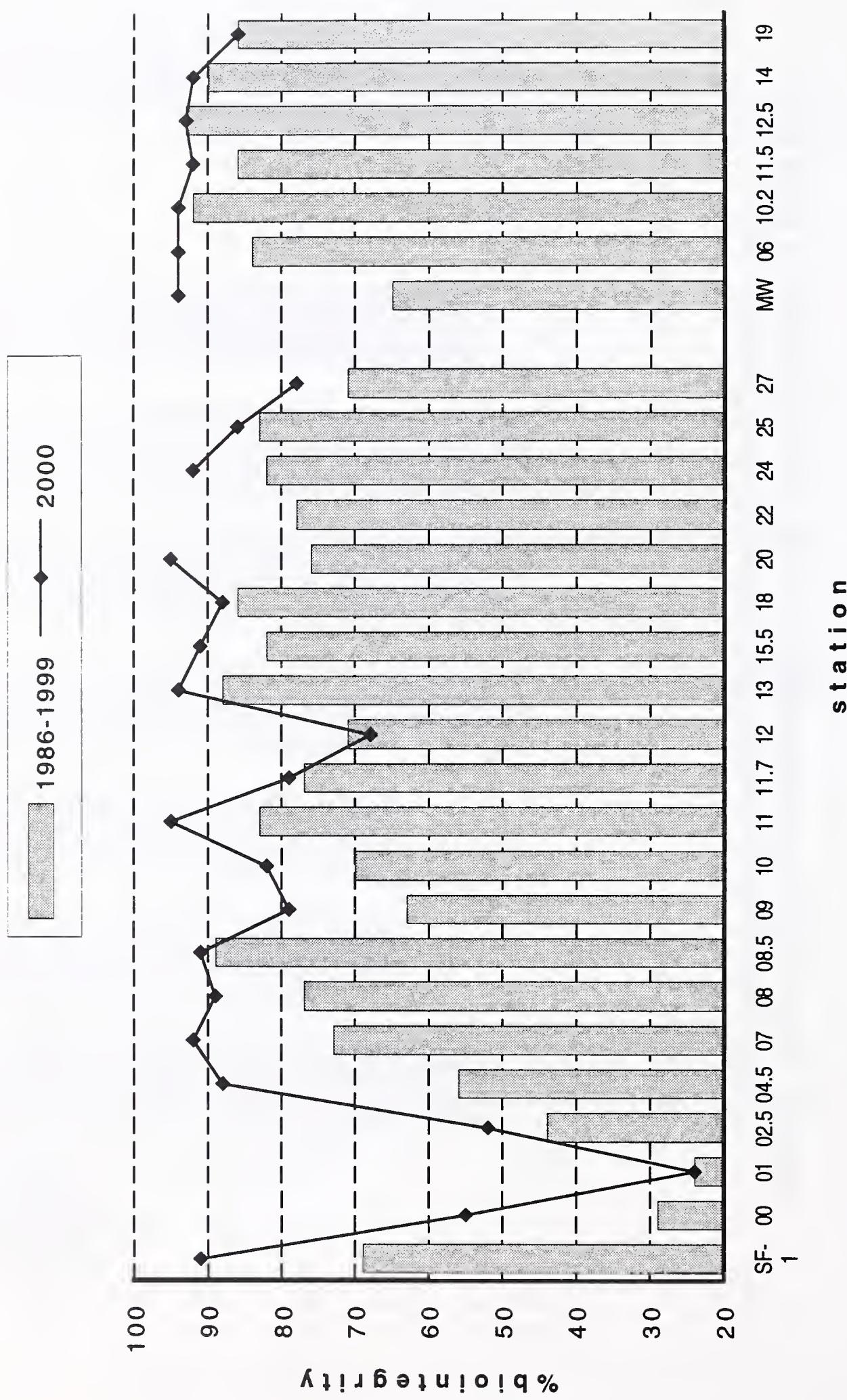


Figure 4. Aquatic macroinvertebrate community biointegrity at 26 stations in the Clark Fork River Basin during August, 2000.

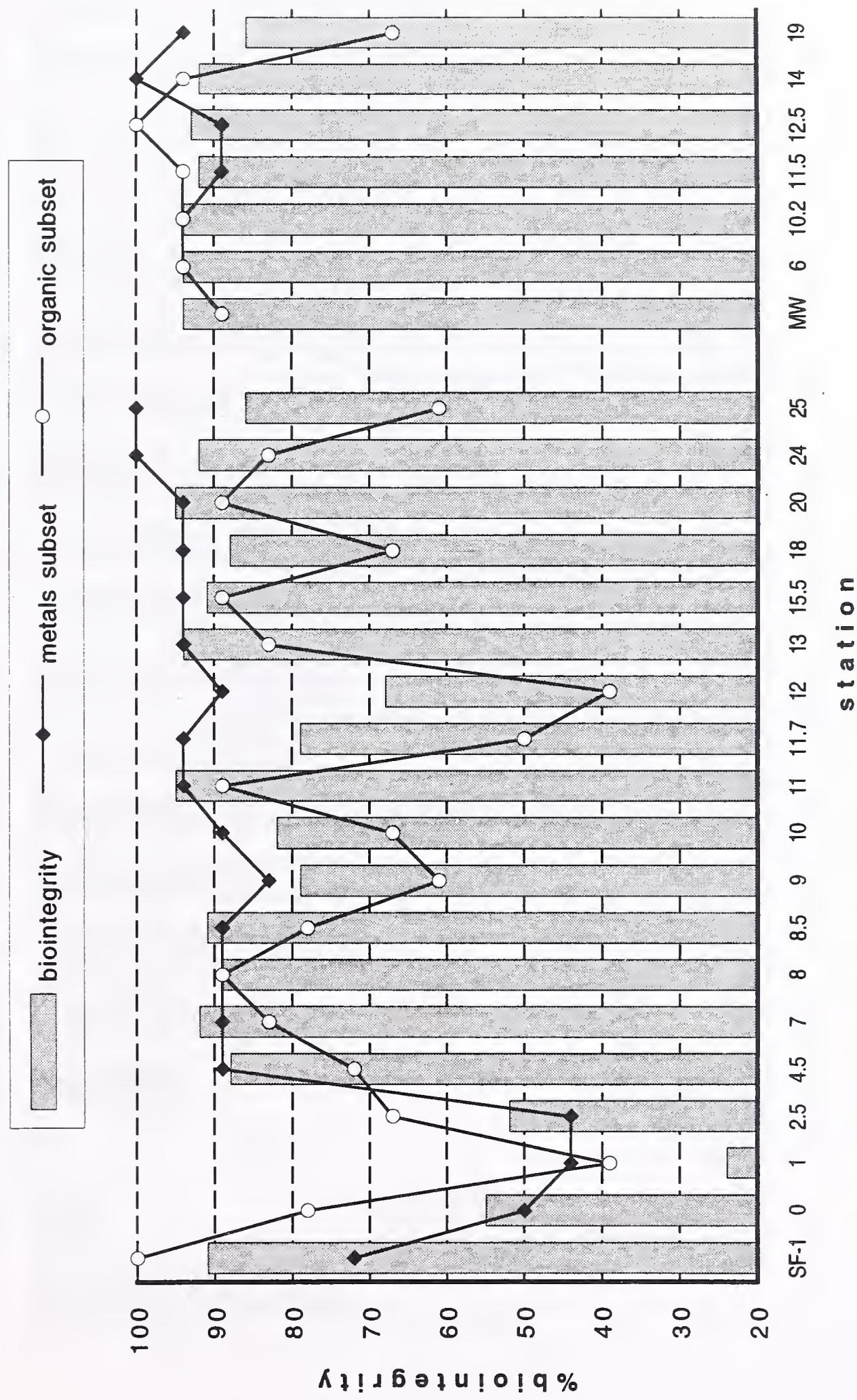


Figure 5. Mean aquatic macroinvertebrate community biointegrity at 20 stations on the Clark Fork River mainstem, 1986- 2000.

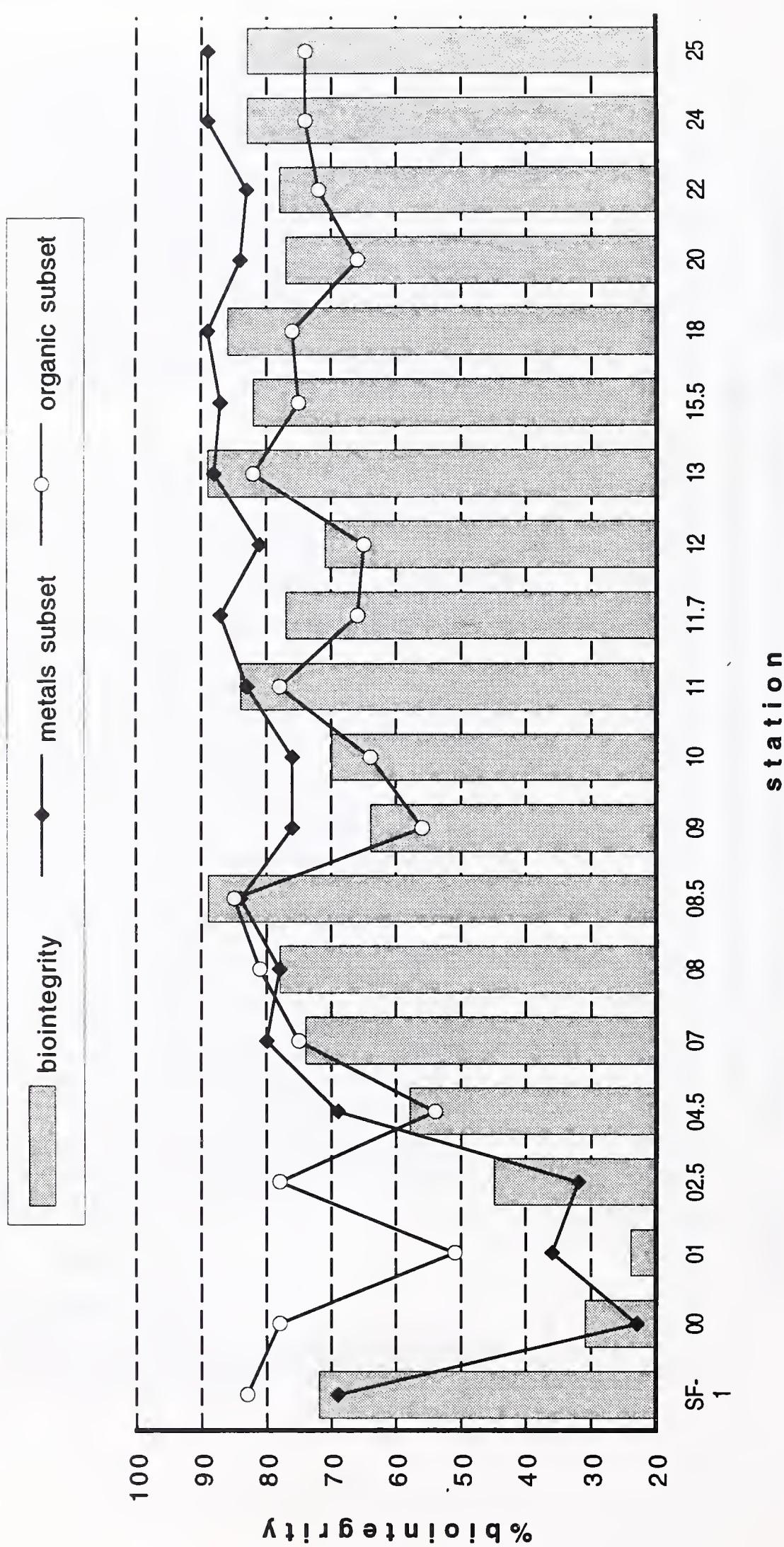


Figure 6. Mean aquatic macroinvertebrate community biointegrity in selected Clark Fork River tributaries, 1993-2000 (except Mill-Willow 1999 and 2000 only).

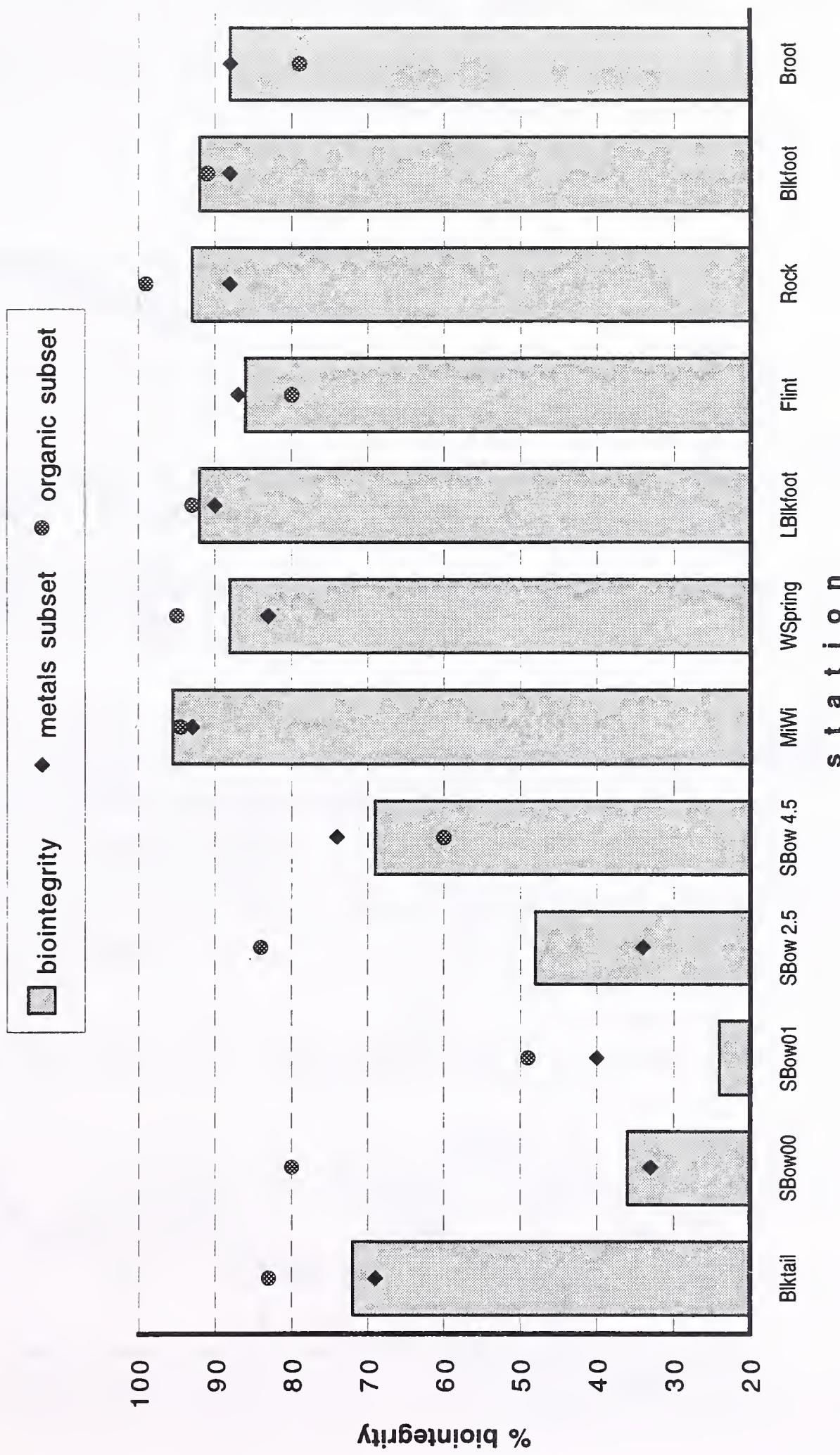


Figure 7. Biointegrity (%) in Blacktail Creek above Grove Gulch (station SF-1), 1993-2000.

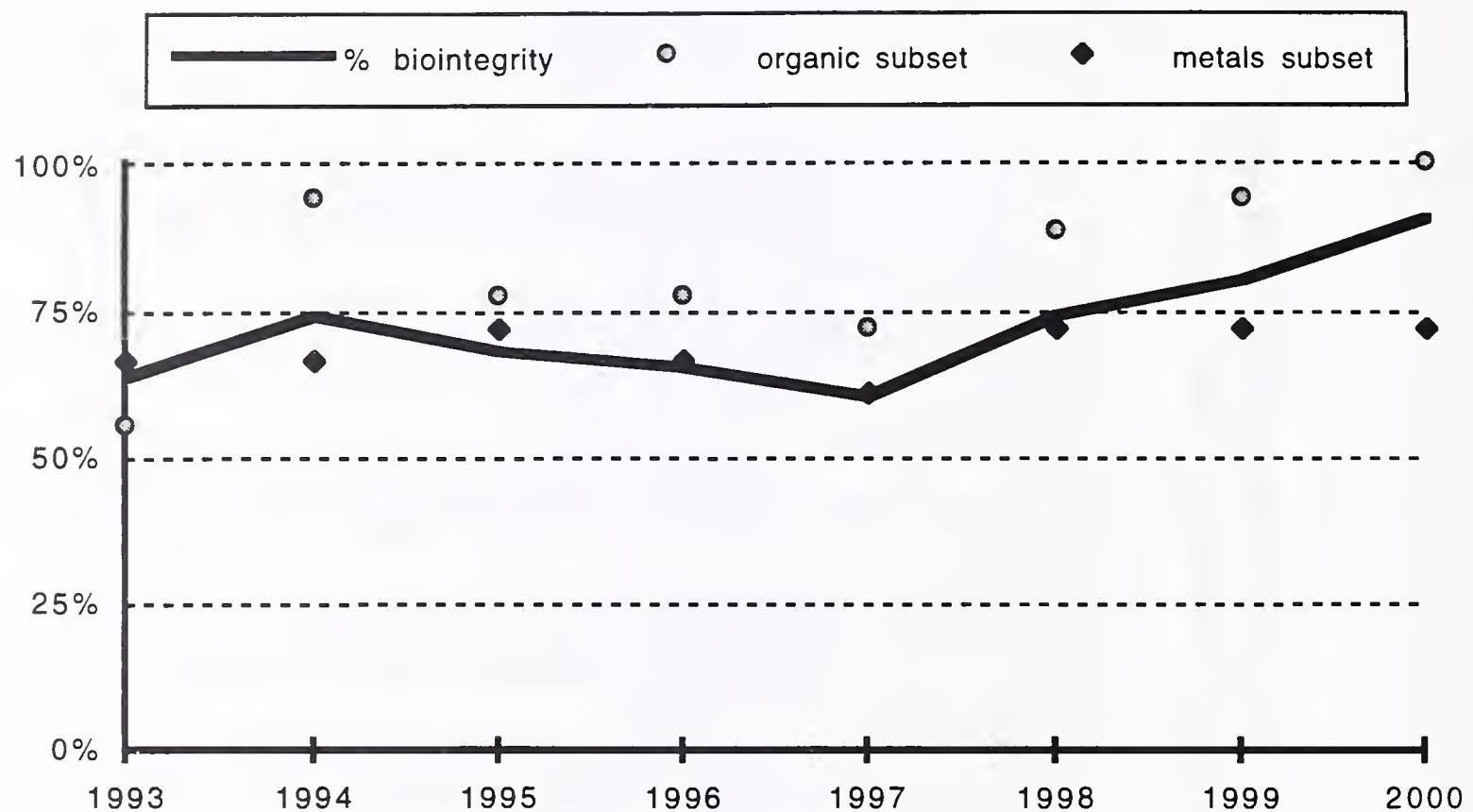


Figure 8. Biointegrity (%) in Silver Bow Creek above the Butte WWTP (station 00), 1987-2000.

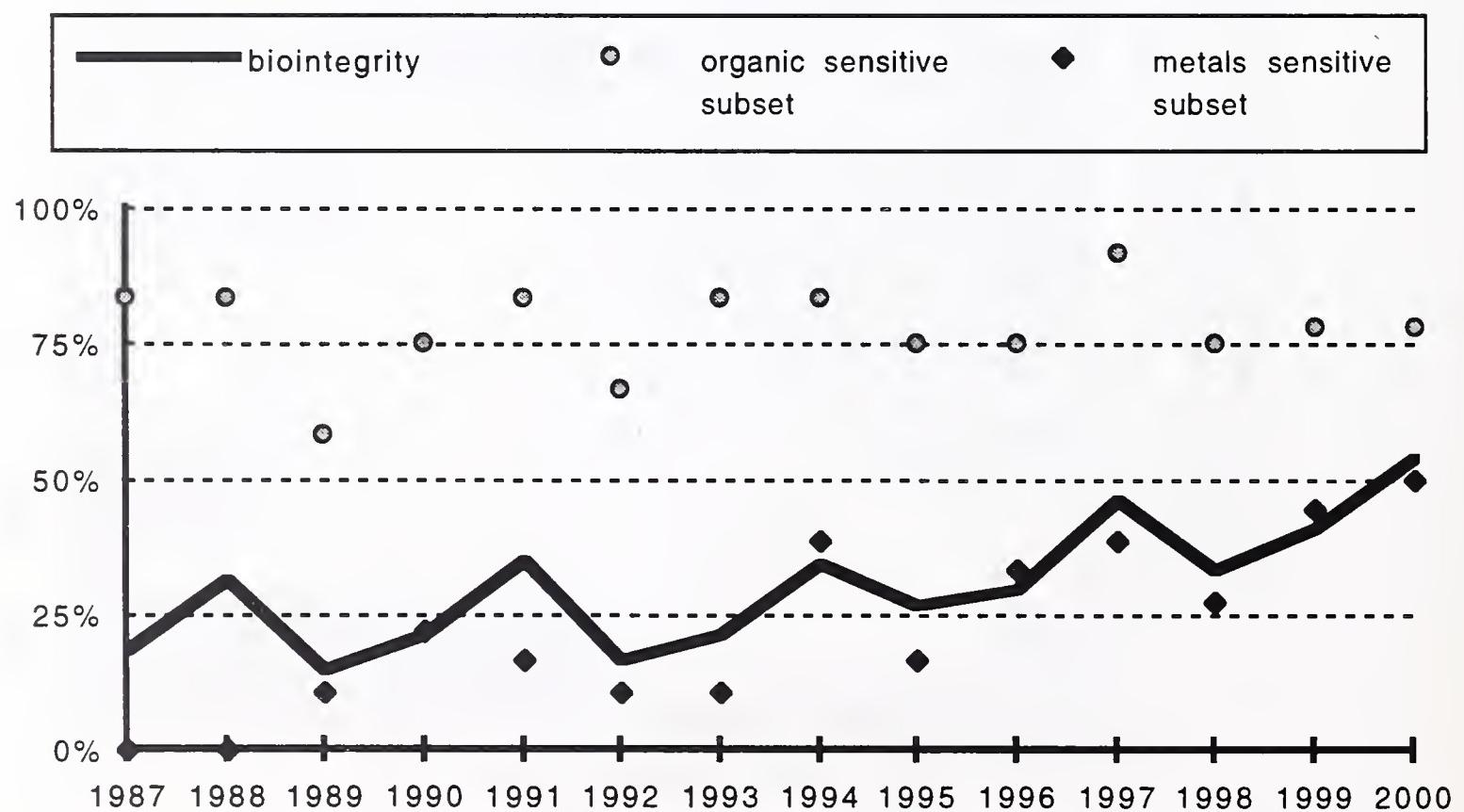


Figure 9. Biointegrity (%) in Silver Bow Creek below the Colorado Tailings (station 01), 1986-2000.

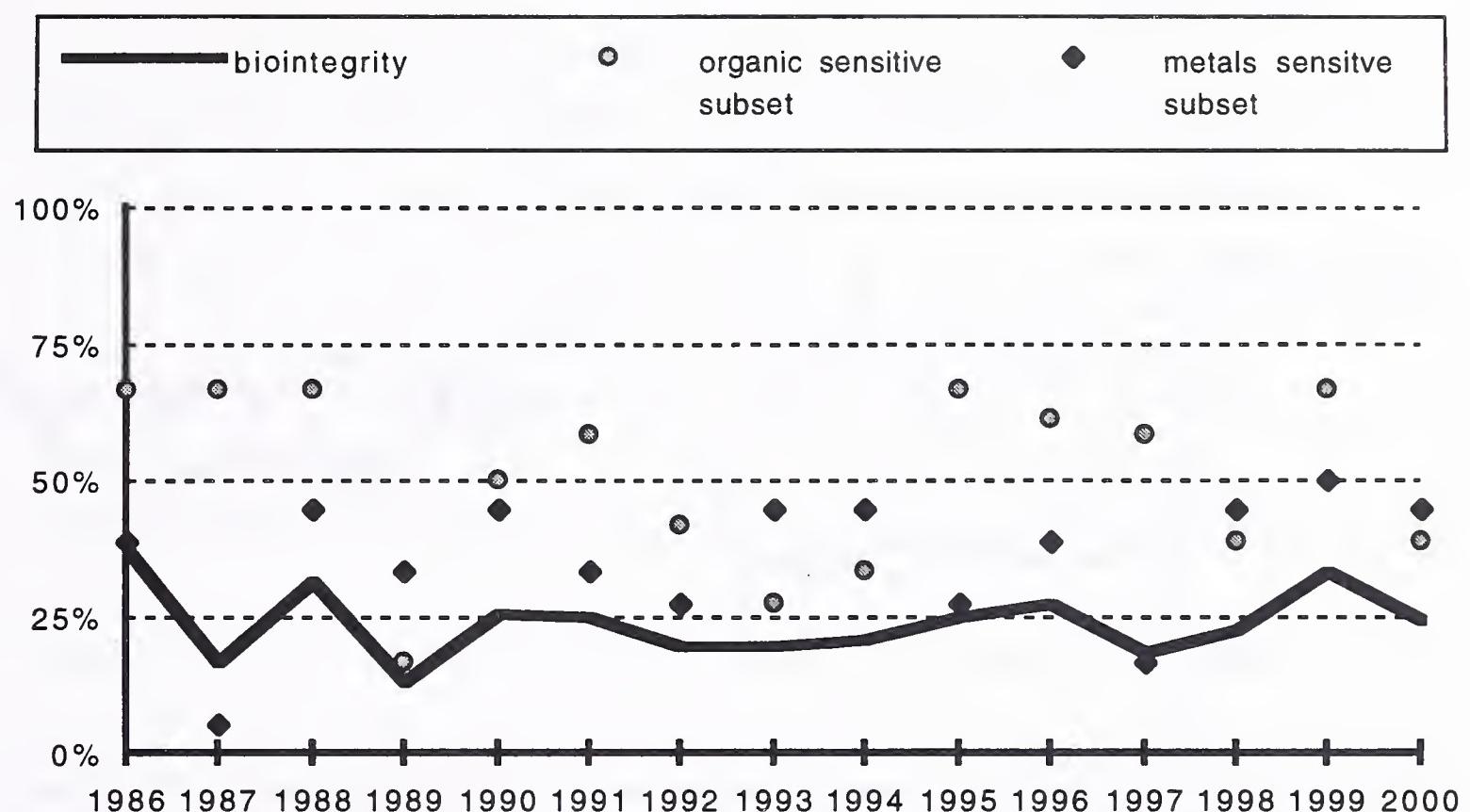


Figure 10. Biointegrity (%) in Silver Bow Creek near Opportunity (station 02.5), 1986-2000.

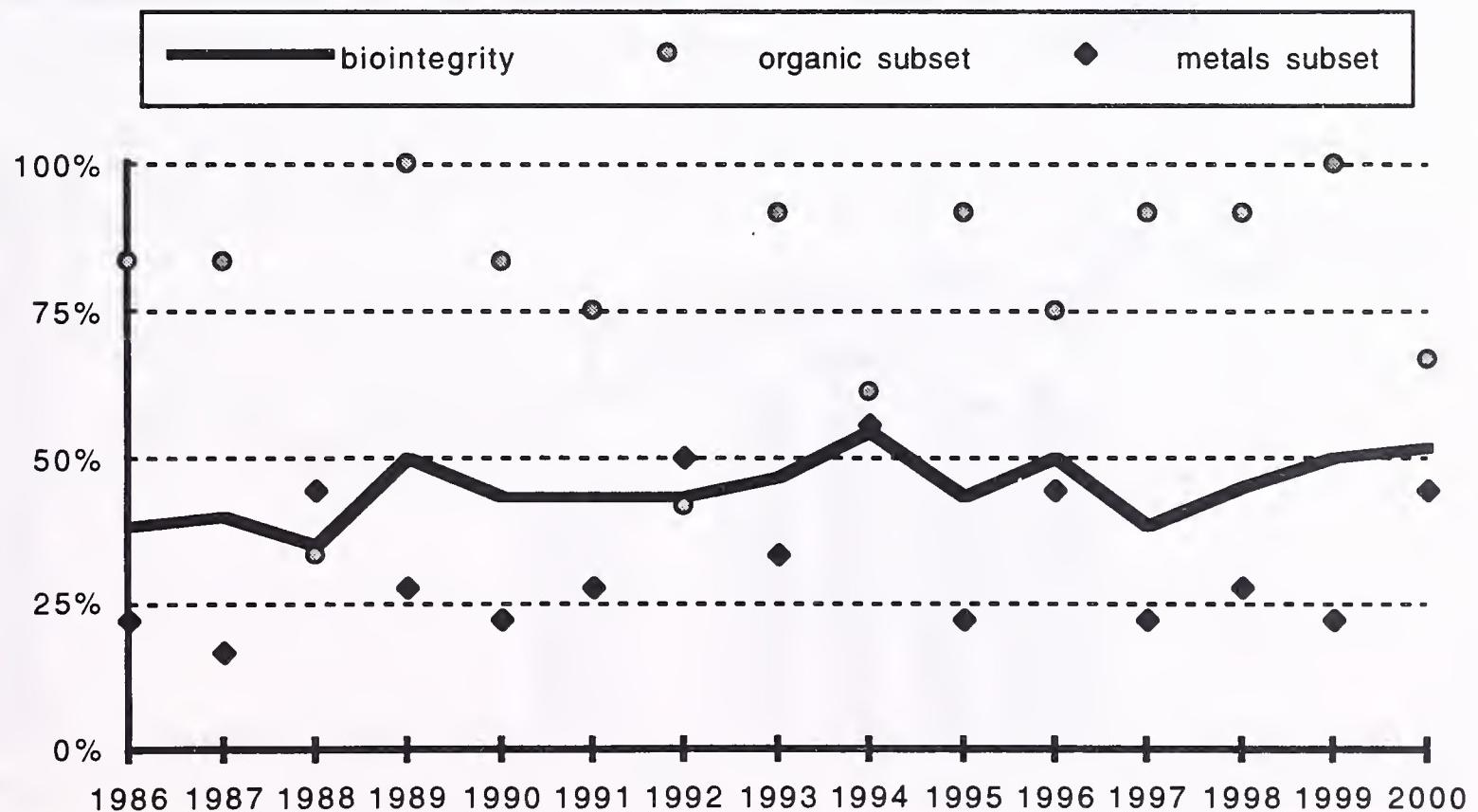


Figure 11. Biointegrity (%) in Silver Bow Creek below the Warm Springs Ponds (station 04, 1986-1991; station 04.5, 1993-2000).

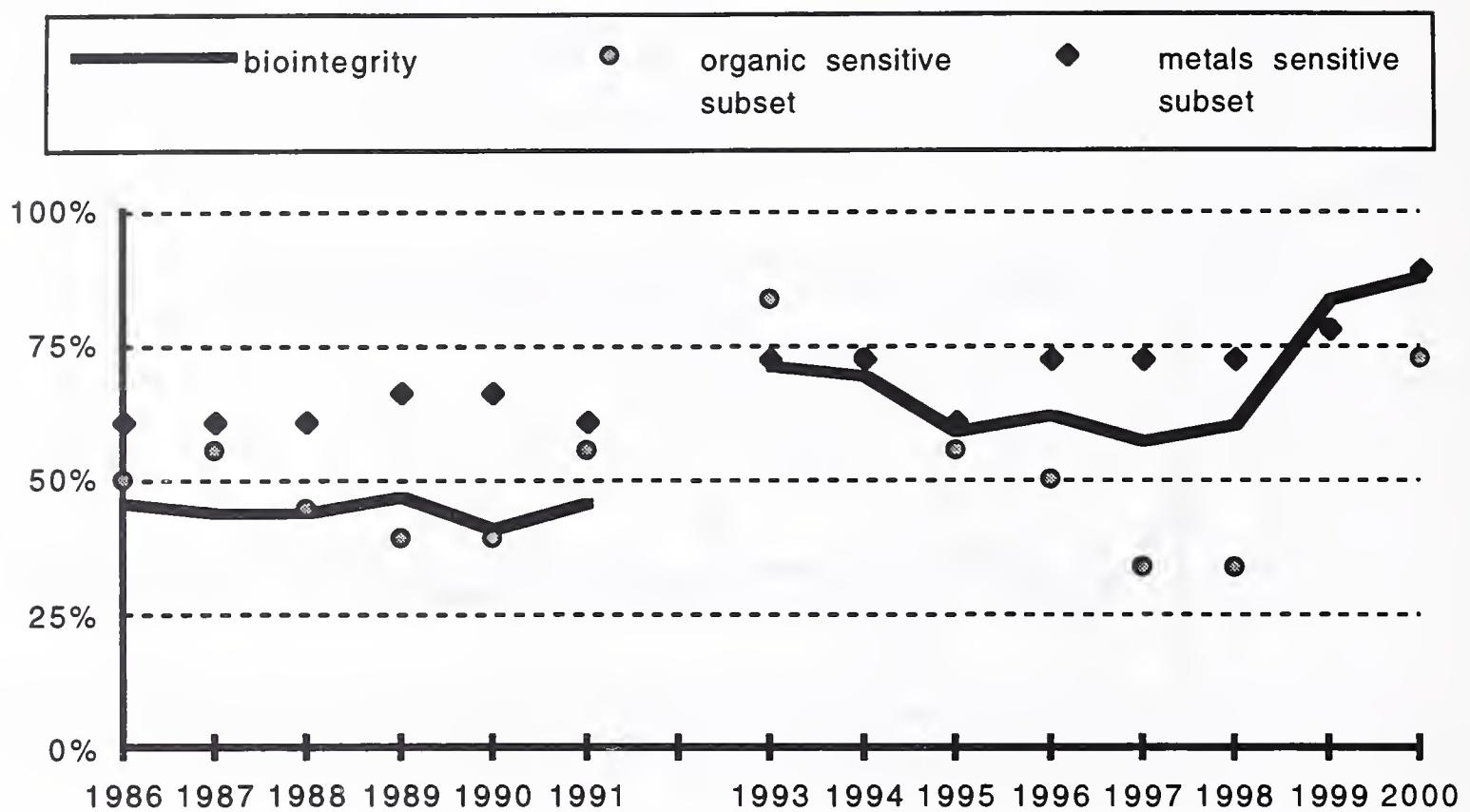


Figure 12. Biointegrity (%) in the Mill-Willow Bypass (station MW-2, 1986-1991 and 1999-2000).

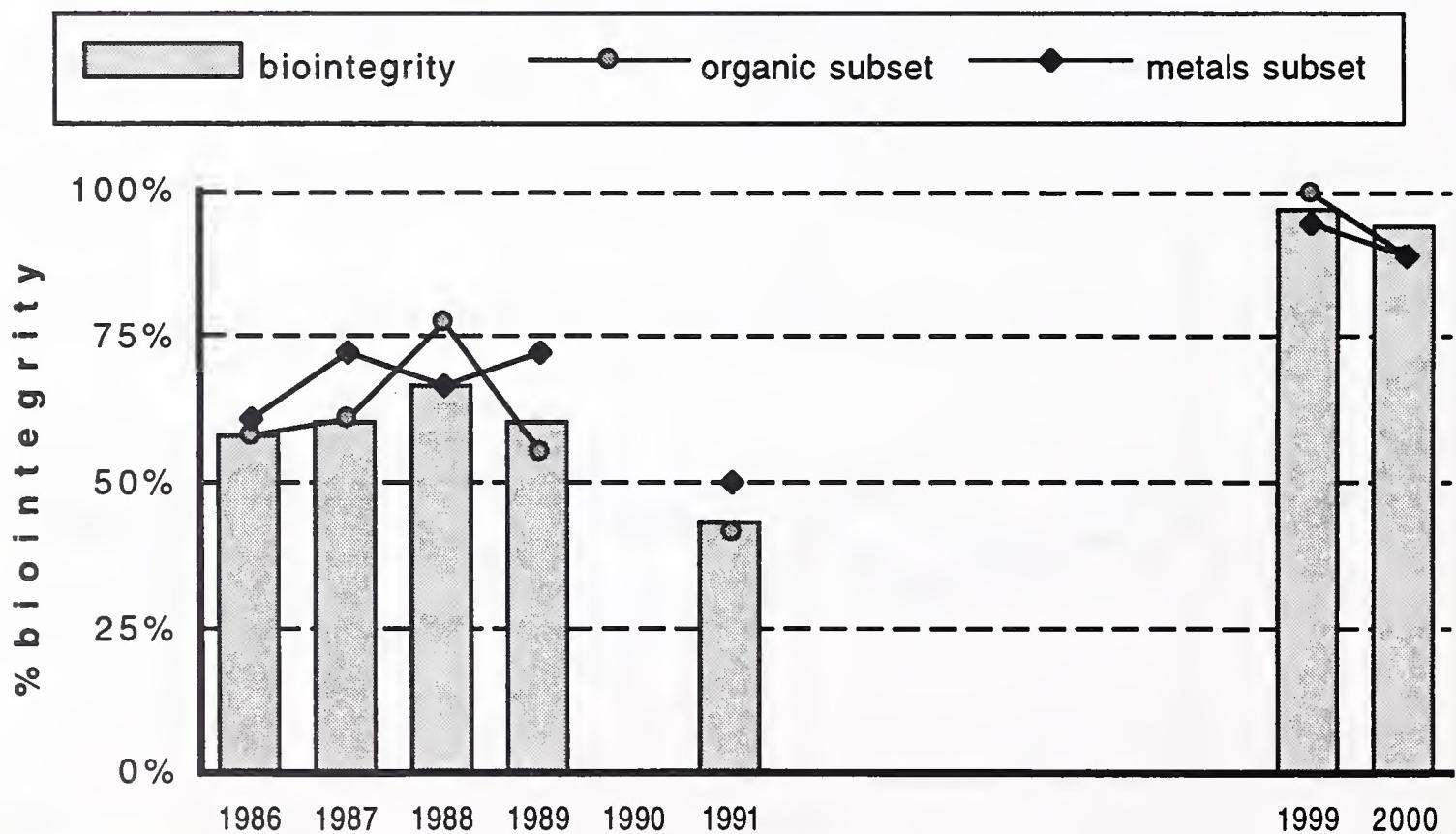


Figure 13. Biointegrity (%) in Warm Springs Creek near mouth (station 06), 1986-2000.

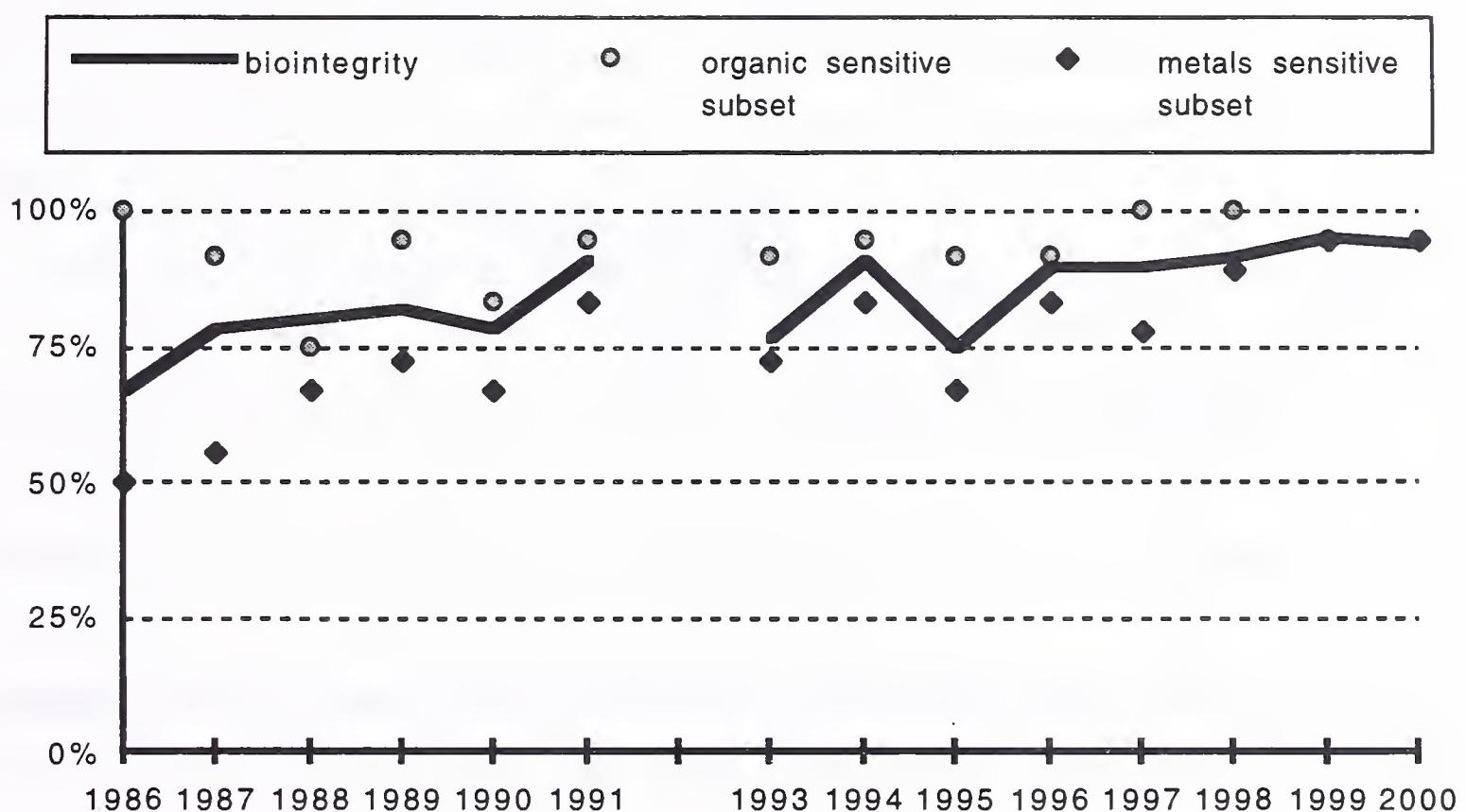


Figure 14. Biointegrity (%) in the Clark Fork River below Warm Springs Creek (station 07), 1986-2000.

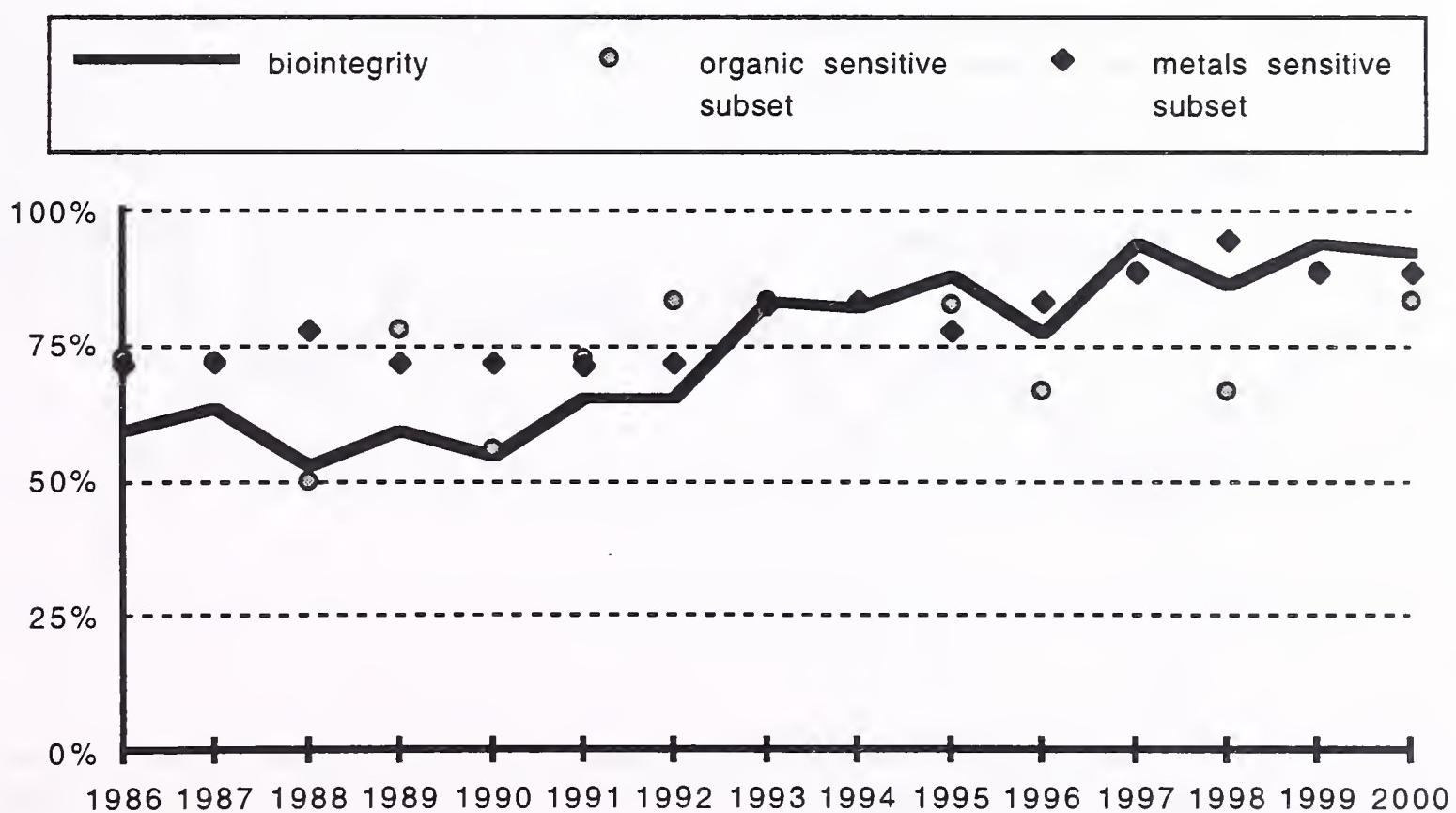


Figure 15. Biointegrity (%) in the Clark Fork River near Dempsey (station 08), 1986-1992, 1998-2000.

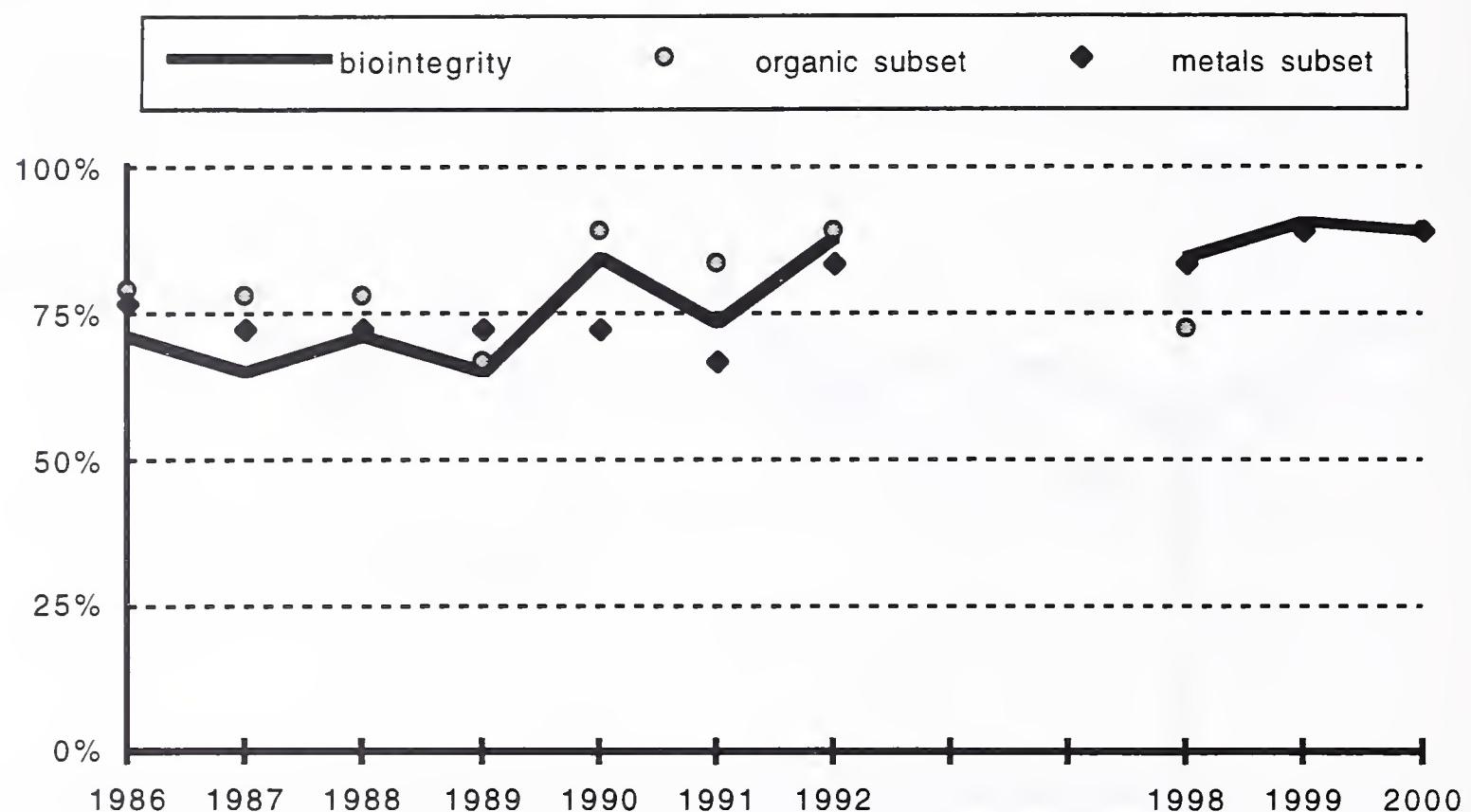


Figure 16. Biointegrity (%) in the Clark Fork River at Sager Lane (station 08.5), 1990-1992, 1998-2000.

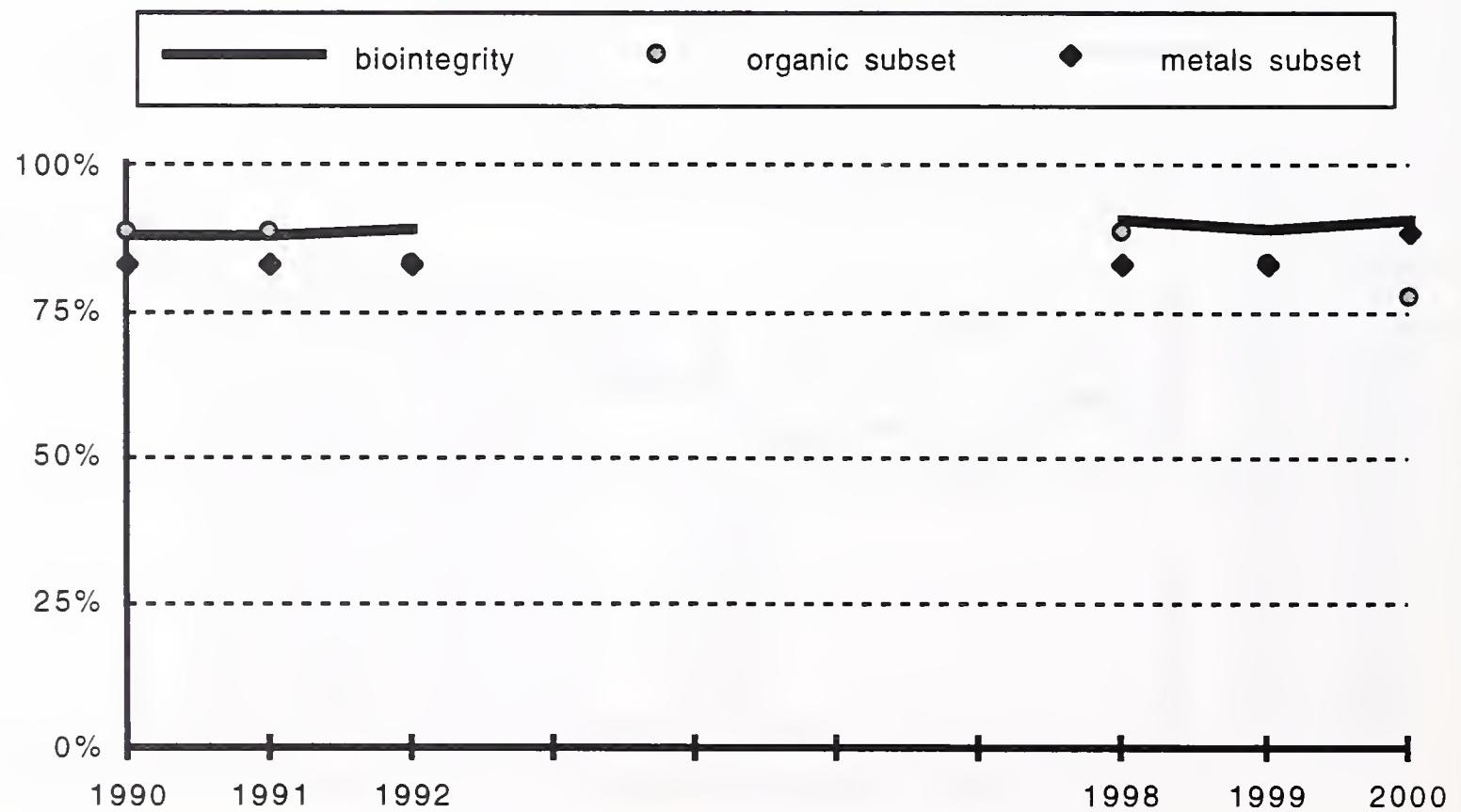


Figure 17. Biointegrity (%) in the Clark Fork River at Deer Lodge (station 09), 1986-2000.

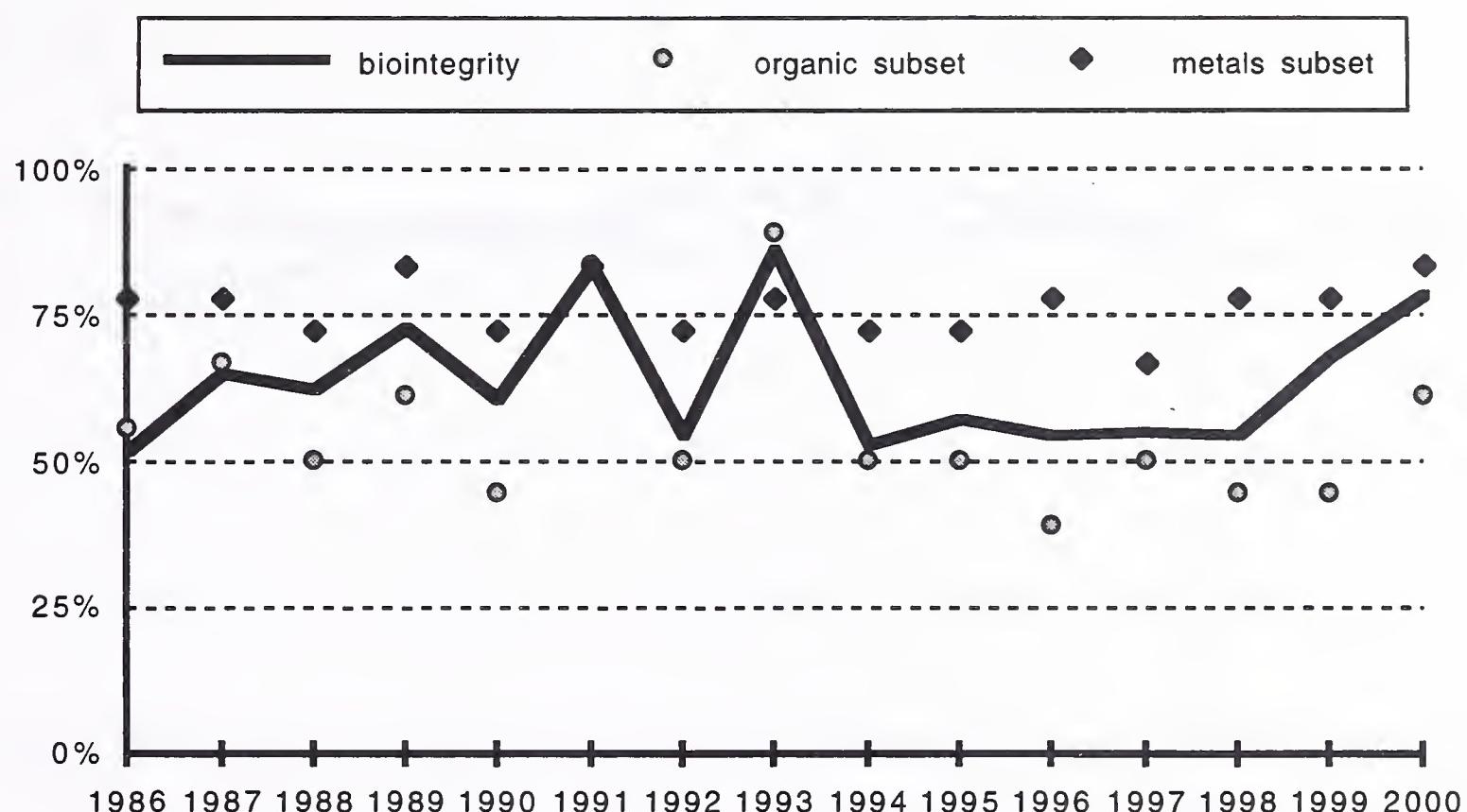


Figure 18. Biointegrity (%) in the Clark Fork River above the Little Blackfoot River (station 10), 1986-2000.

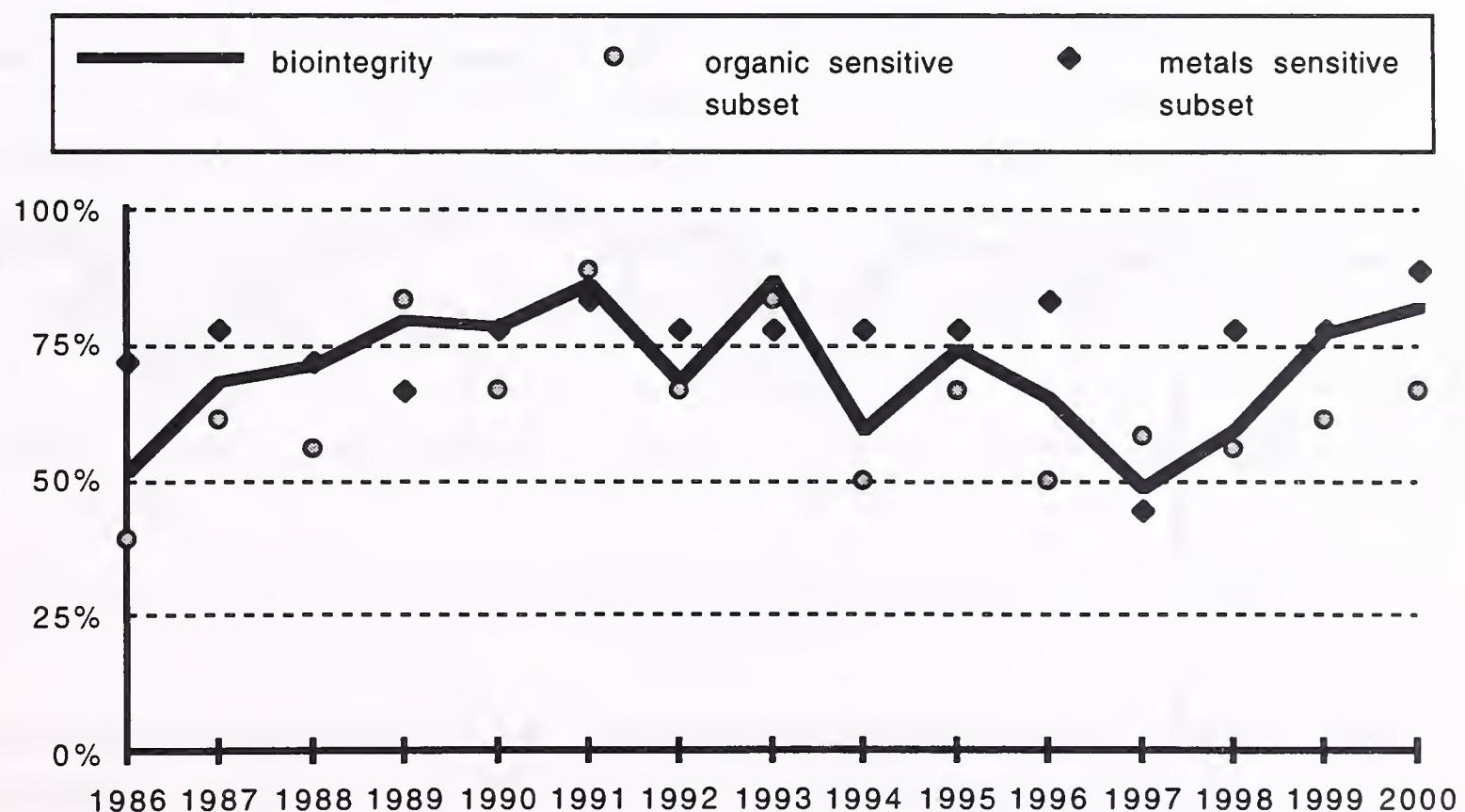


Figure 19. Biointegrity (%) in the Little Blackfoot River near mouth (station 10.2), 1993-2000.

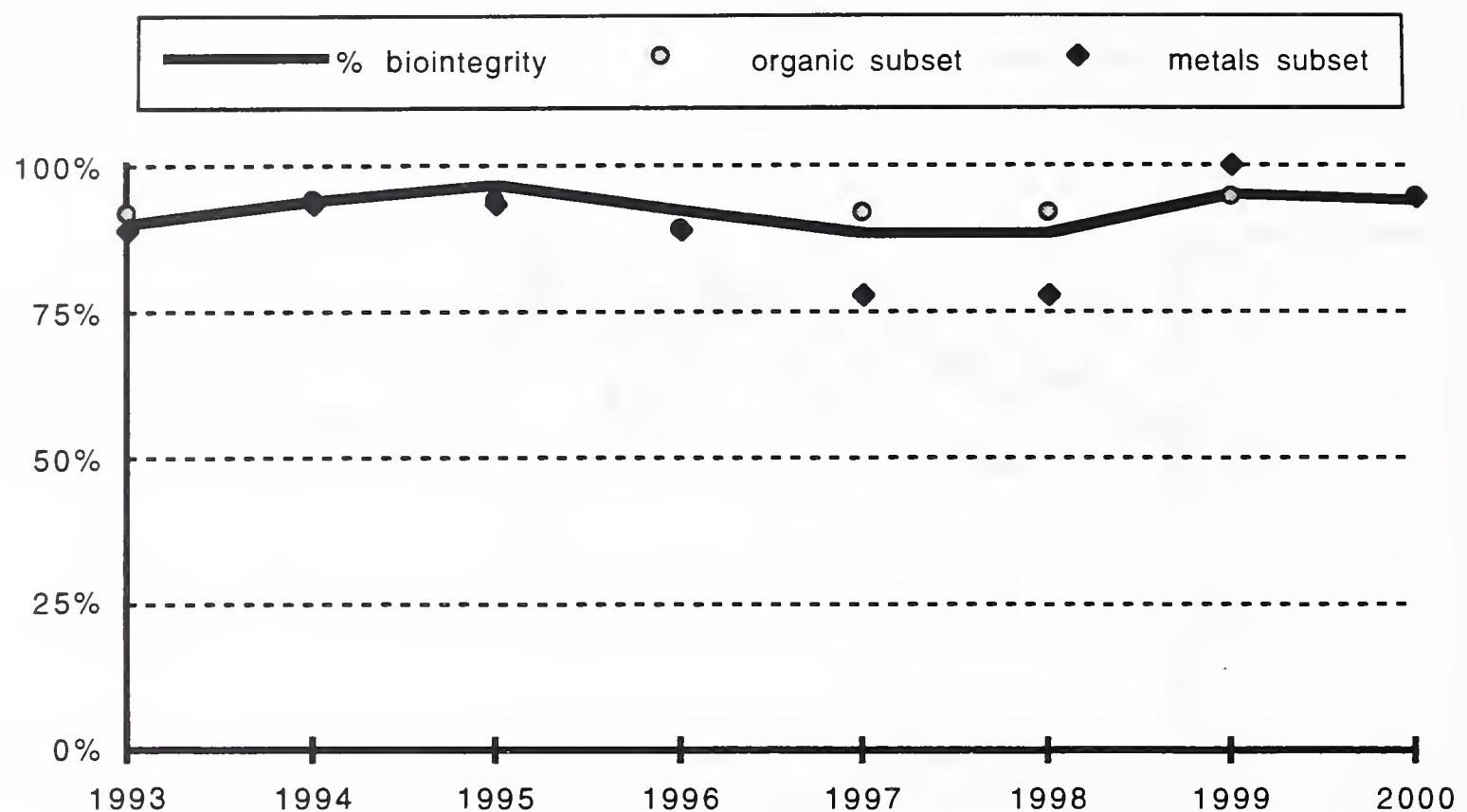


Figure 20. Biointegrity (%) in the Clark Fork River at Gold Creek Bridge (station 11), 1986-2000.

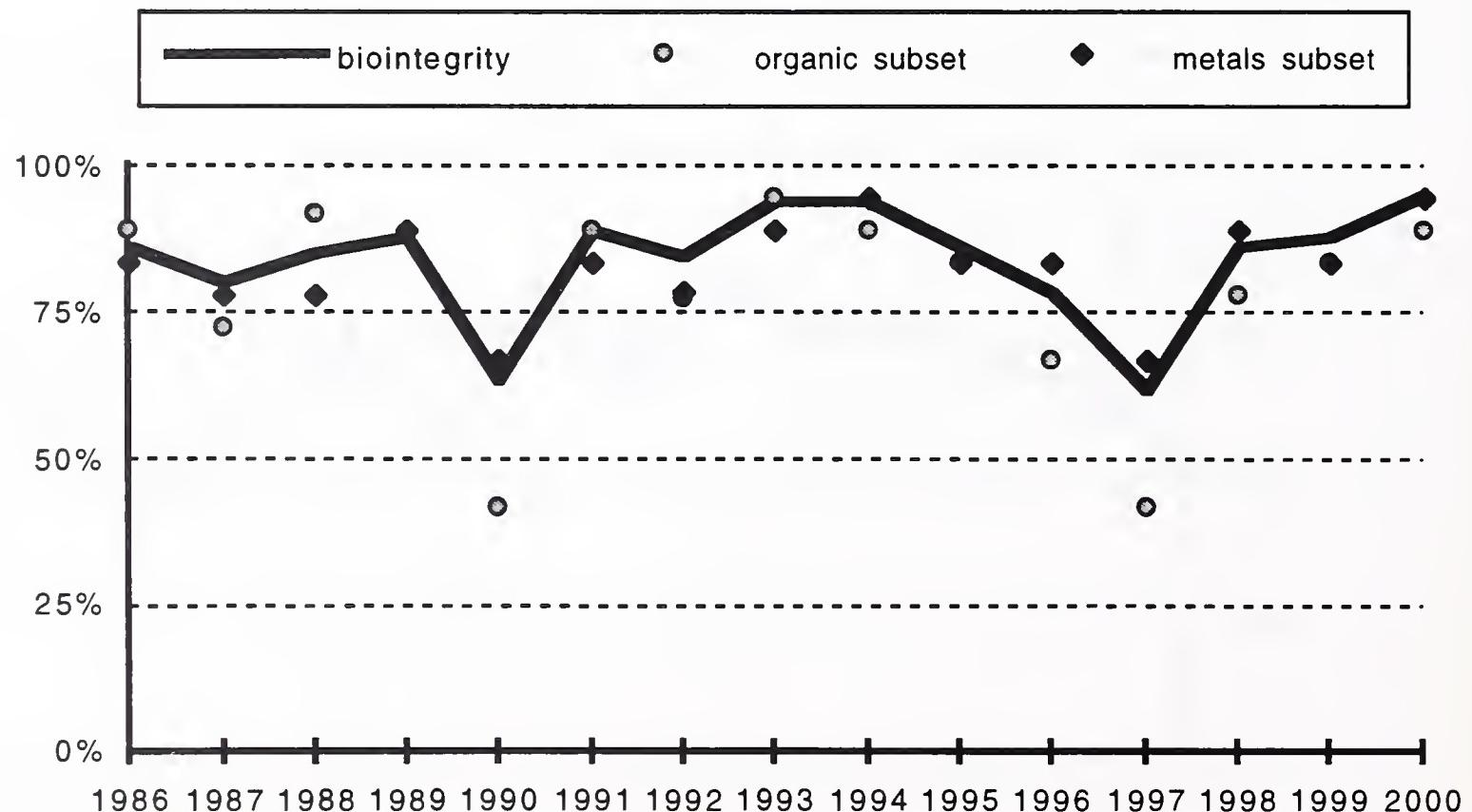


Figure 21. Biointegrity (%) in Flint Creek at New Chicago (station 11.5), 1993-2000.

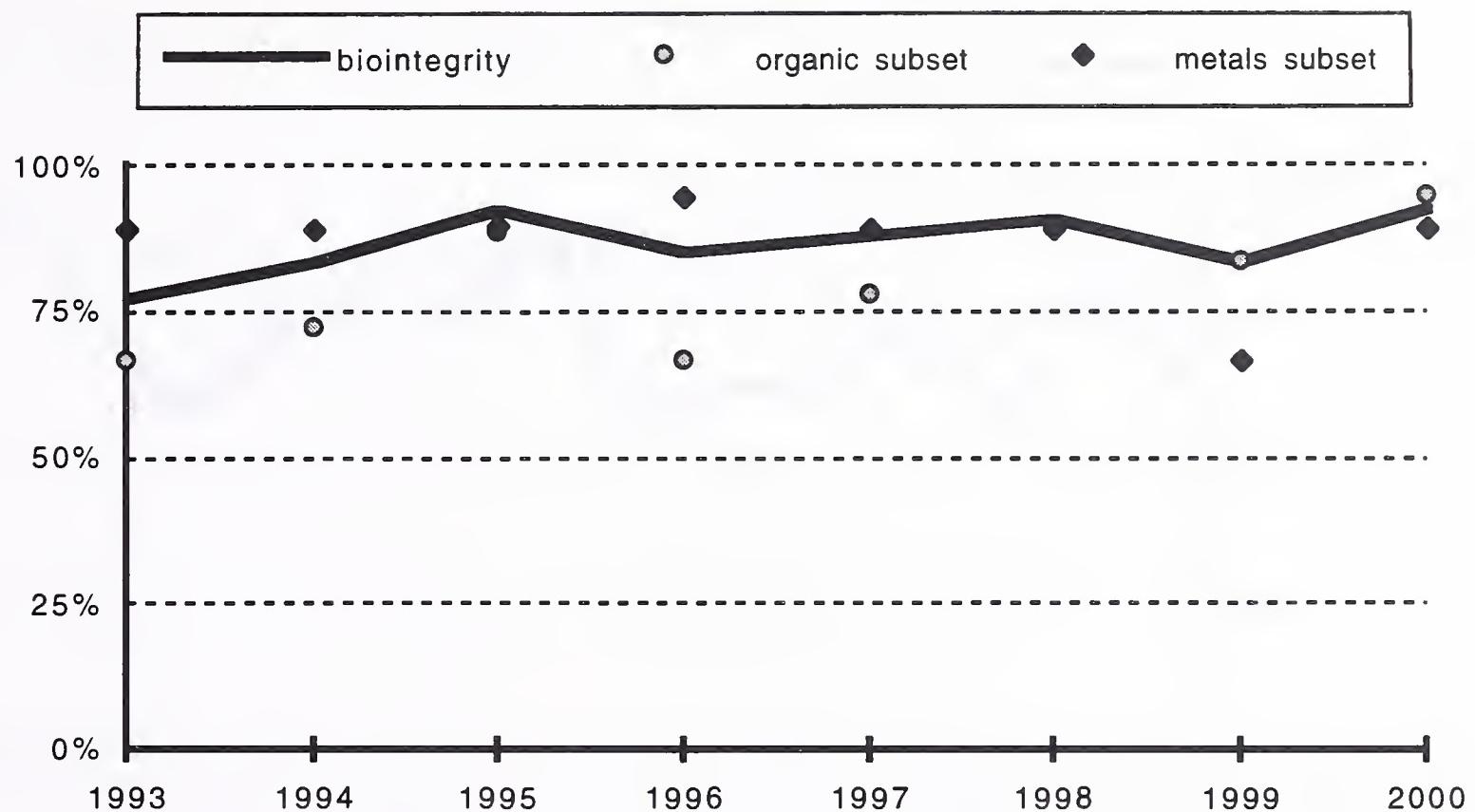


Figure 22. Biointegrity (%) in the Clark Fork River at Bearmouth (station 11.7), 1993-2000.

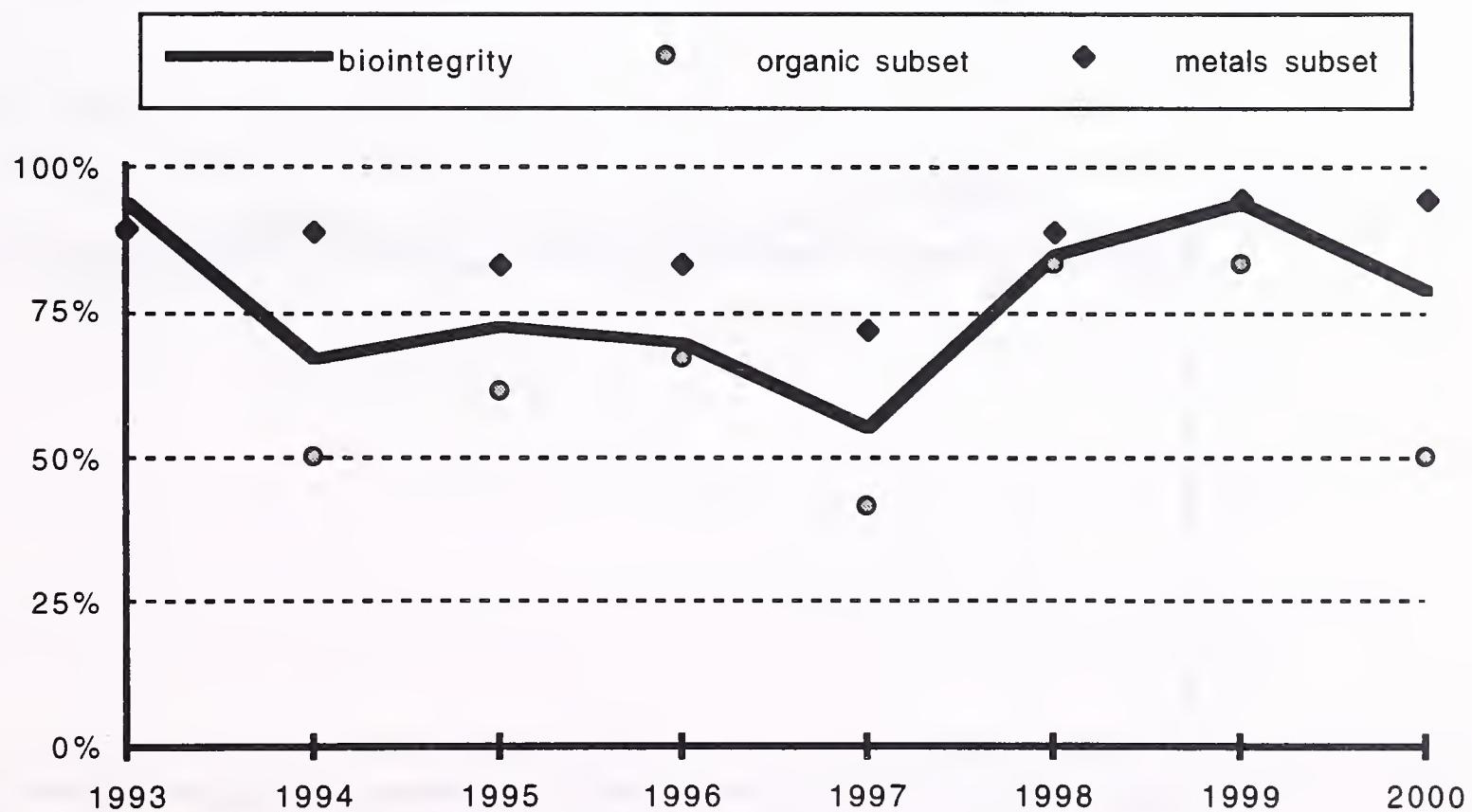


Figure 23. Biointegrity (%) in the Clark Fork River at Bonita (station 12), 1986-2000.

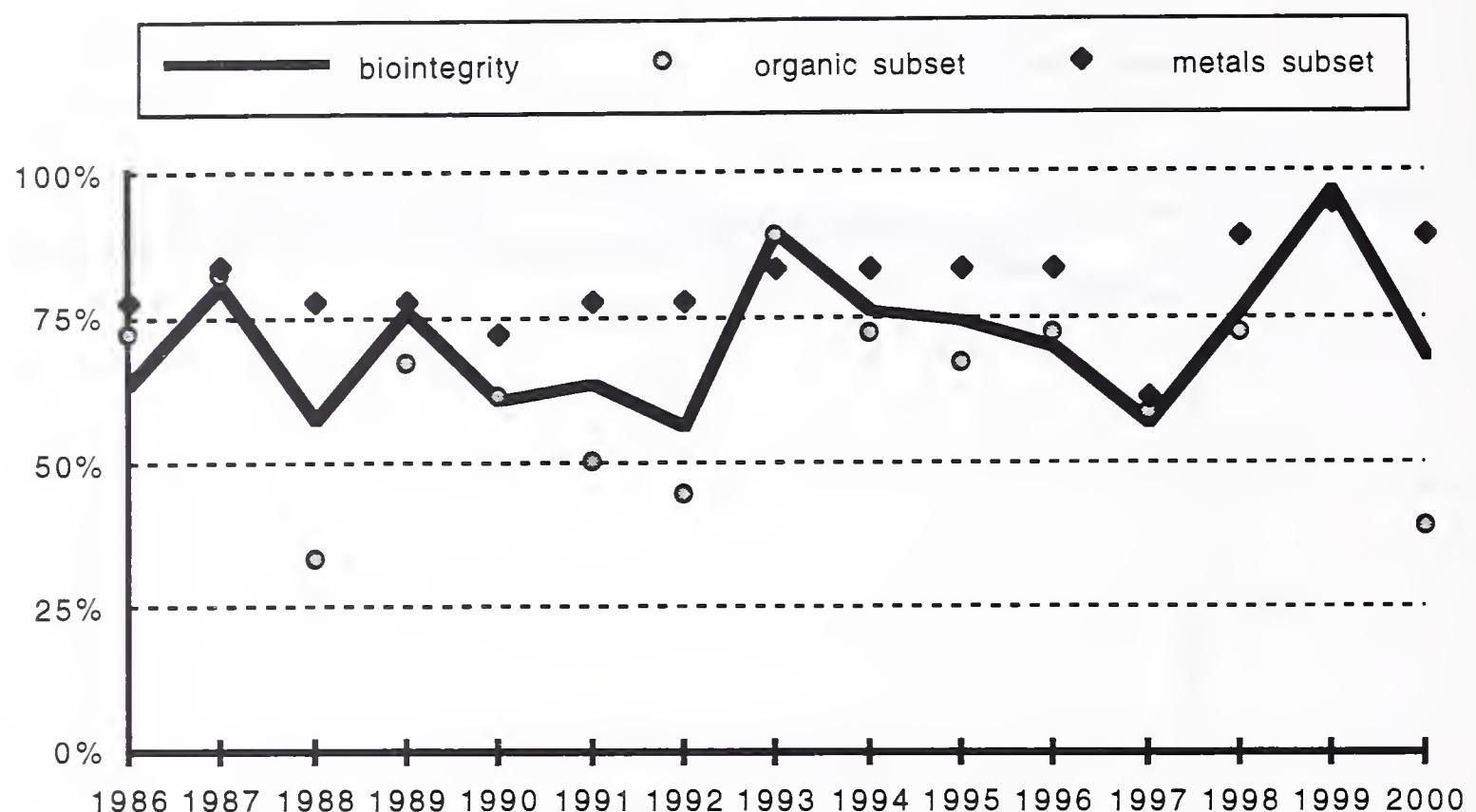


Figure 24. Biointegrity (%) in Rock Creek near mouth (station 12.5), 1993-2000.

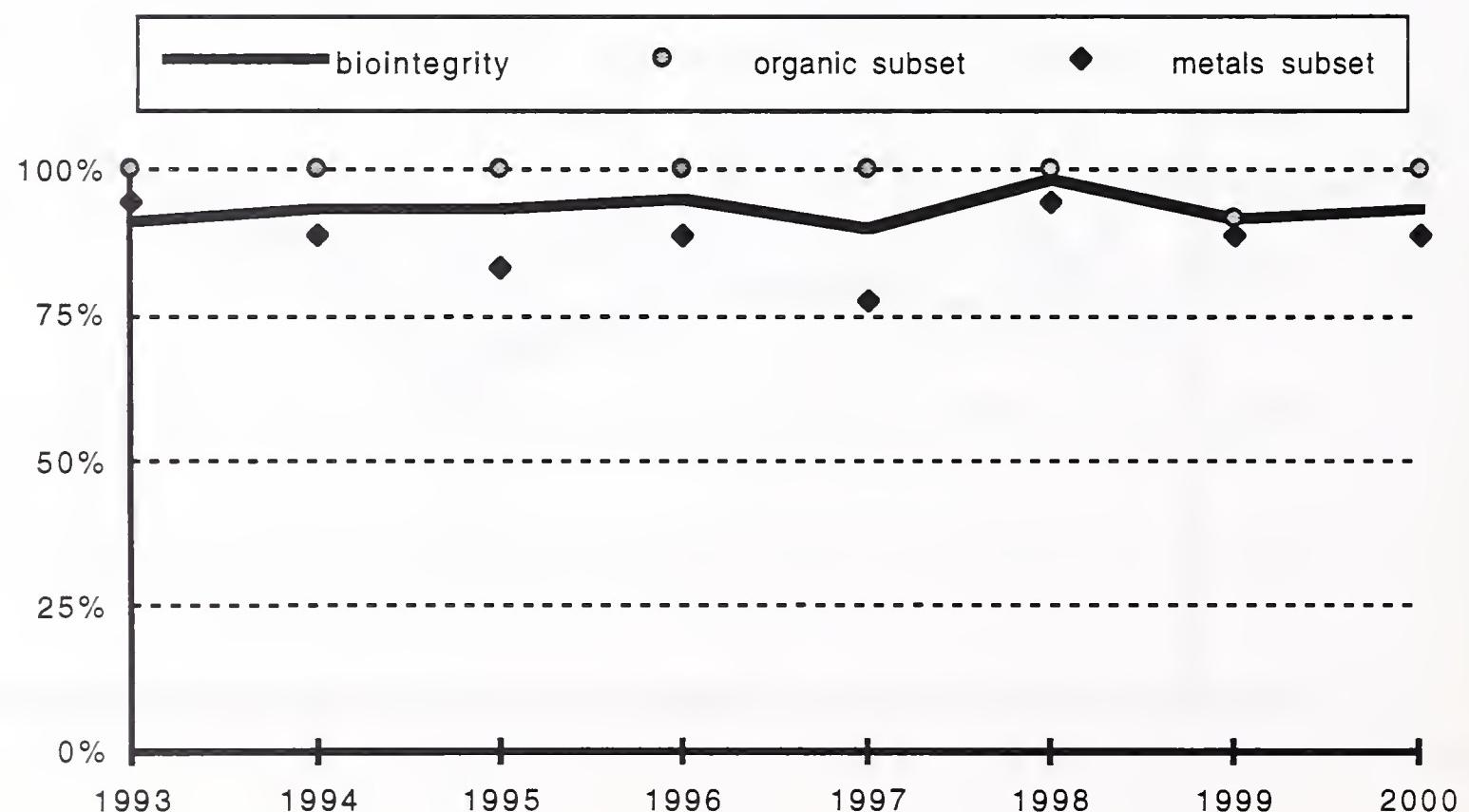


Figure 25. Biointegrity (%) in the Clark Fork River at Turah (station 13), 1986-2000.

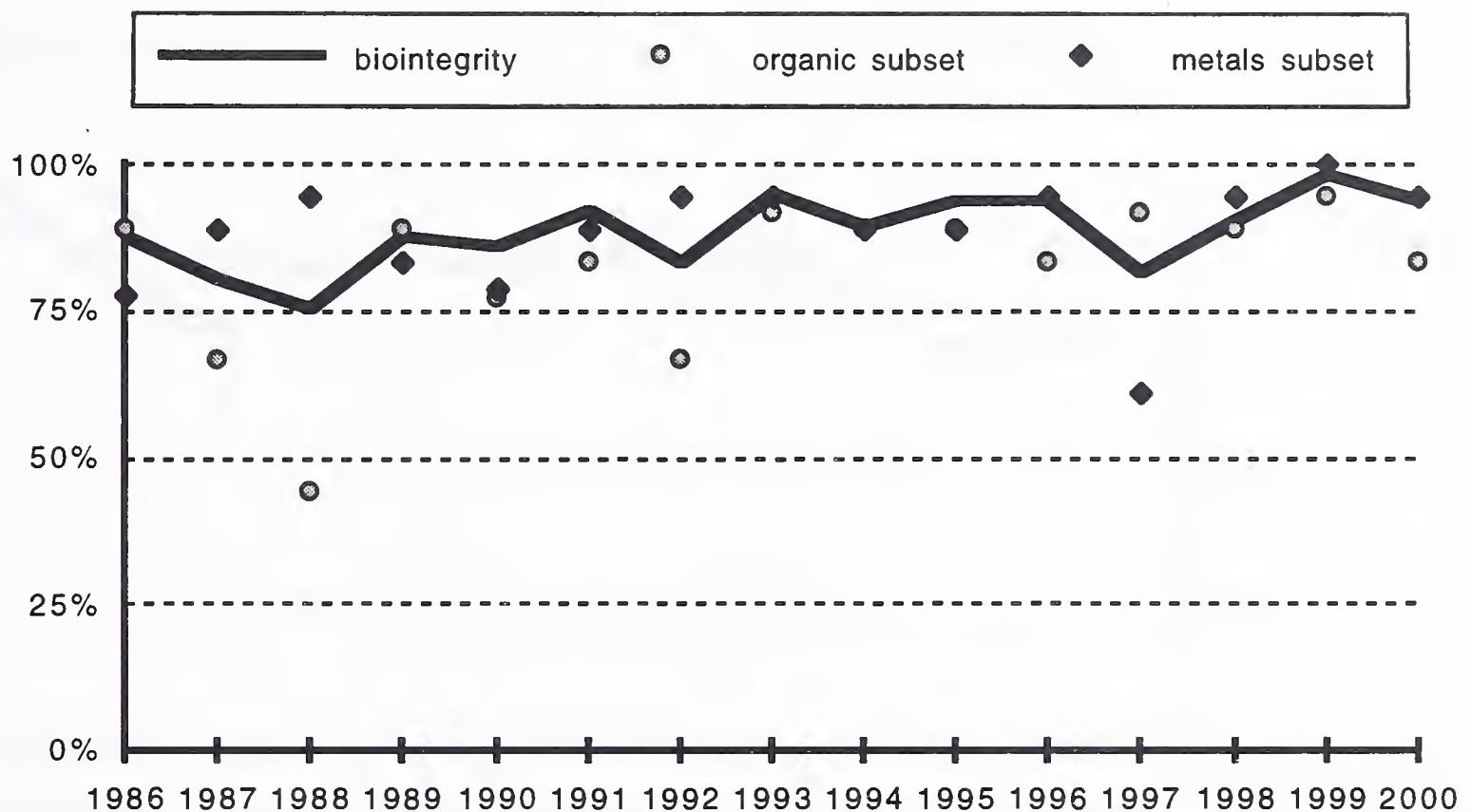


Figure 26. Biointegrity (%) in the Blackfoot River near mouth (station 14), 1986-2000.

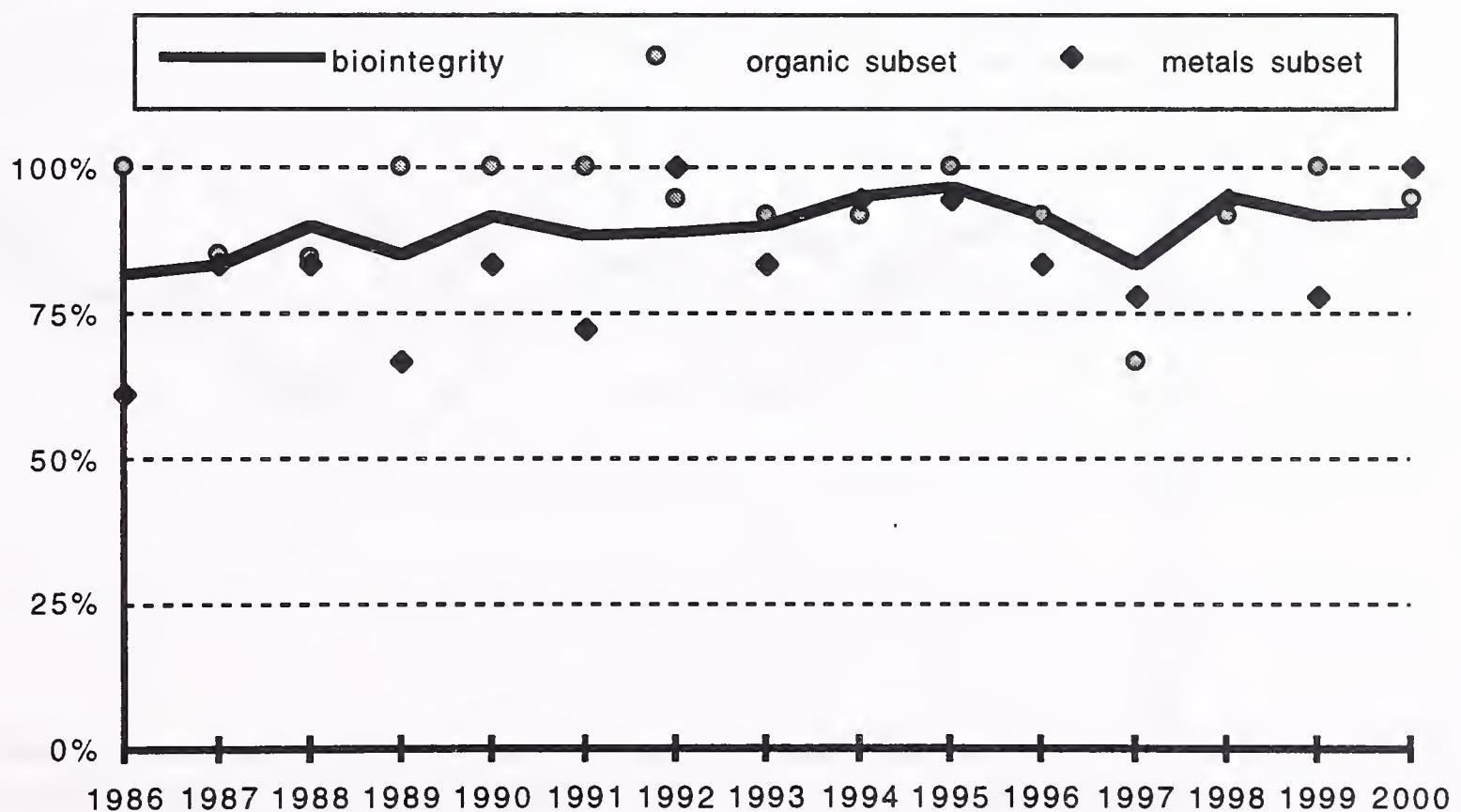


Figure 27. Biointegrity (%) in the Clark Fork River above Missoula (station 15.5), 1989-2000.

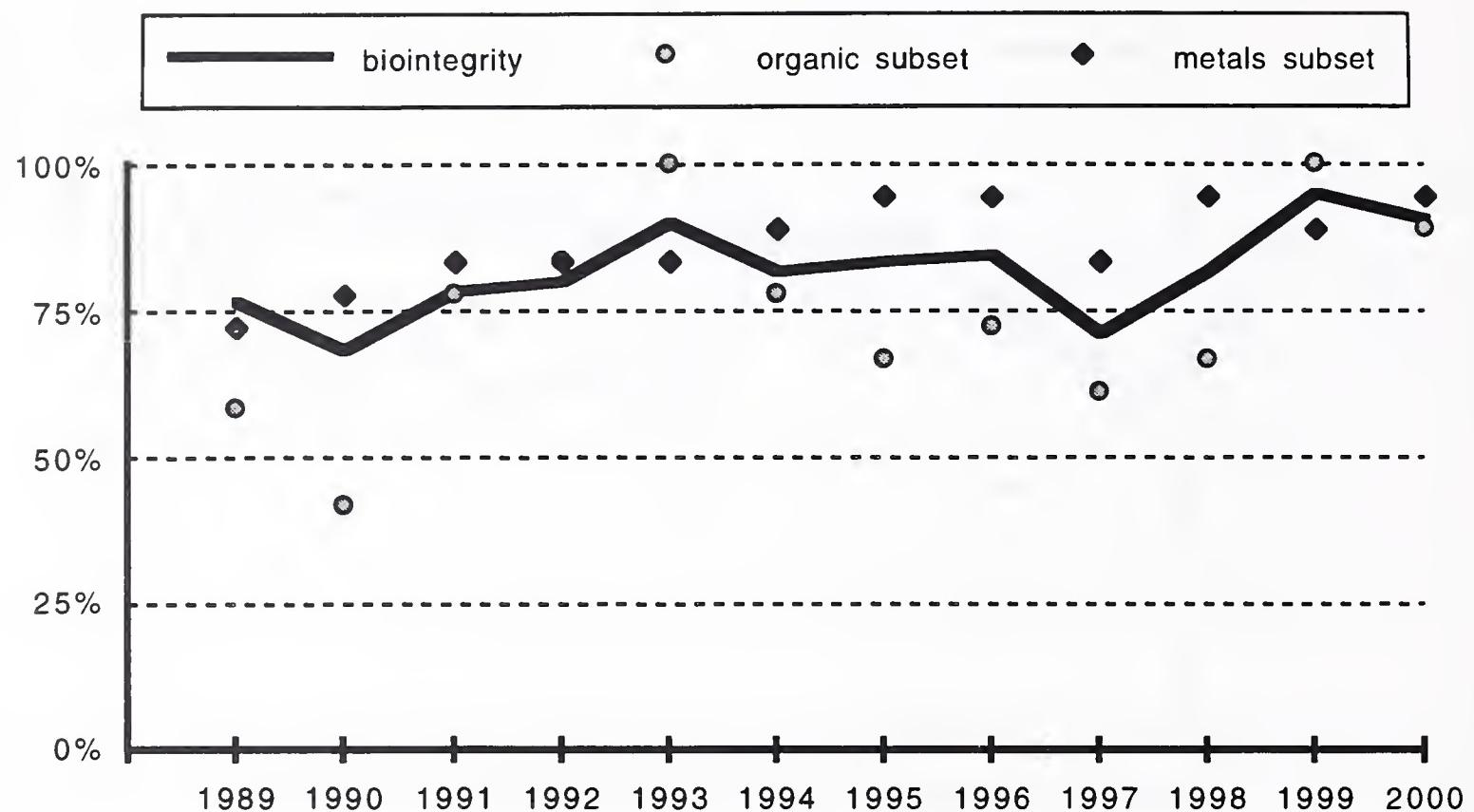


Figure 28. Biointegrity (%) in the Clark Fork River at Shuffields (station 18), 1986-2000.

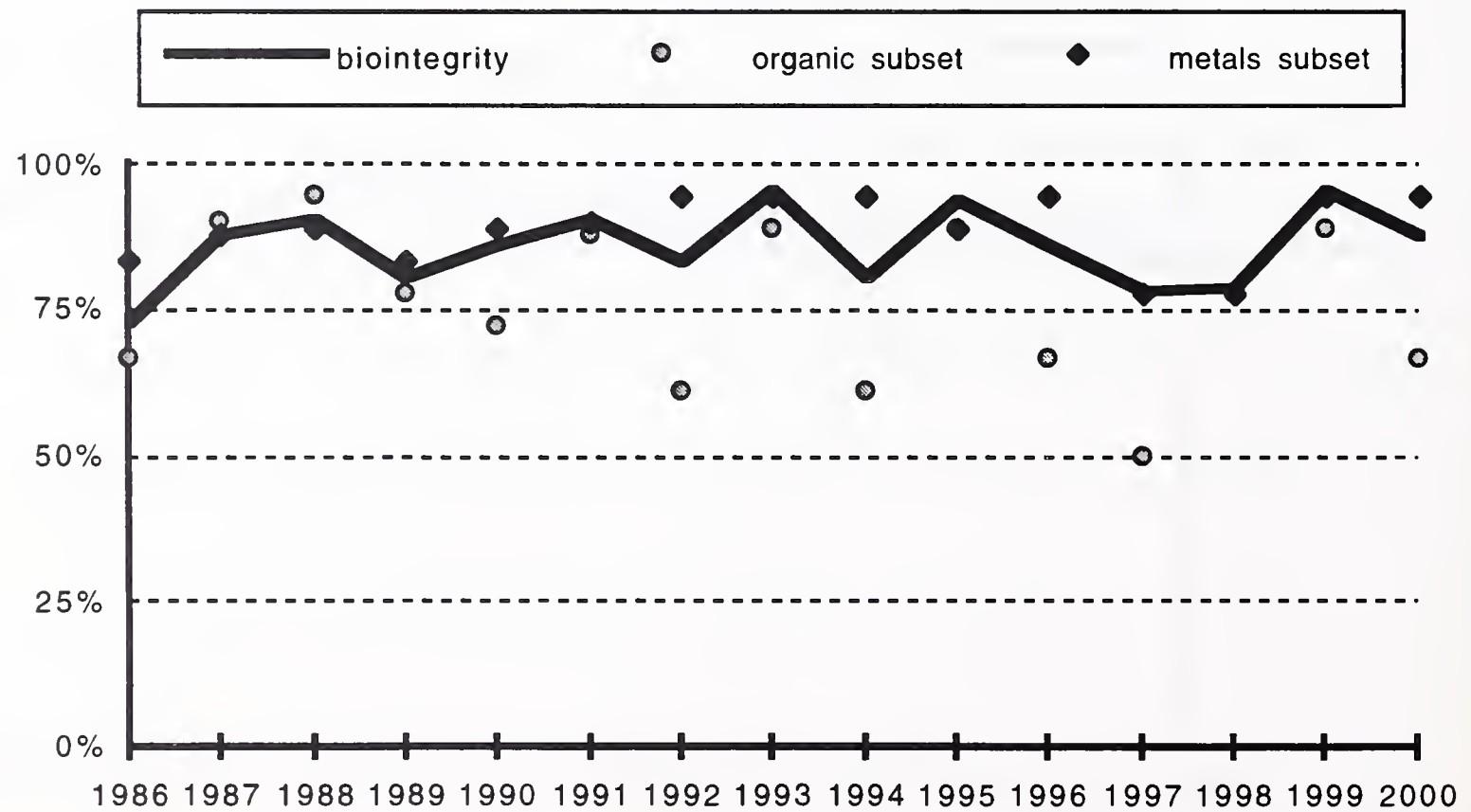


Figure 29. Biointegrity (%) in the Bitterroot River near mouth (station 19), 1986-2000.

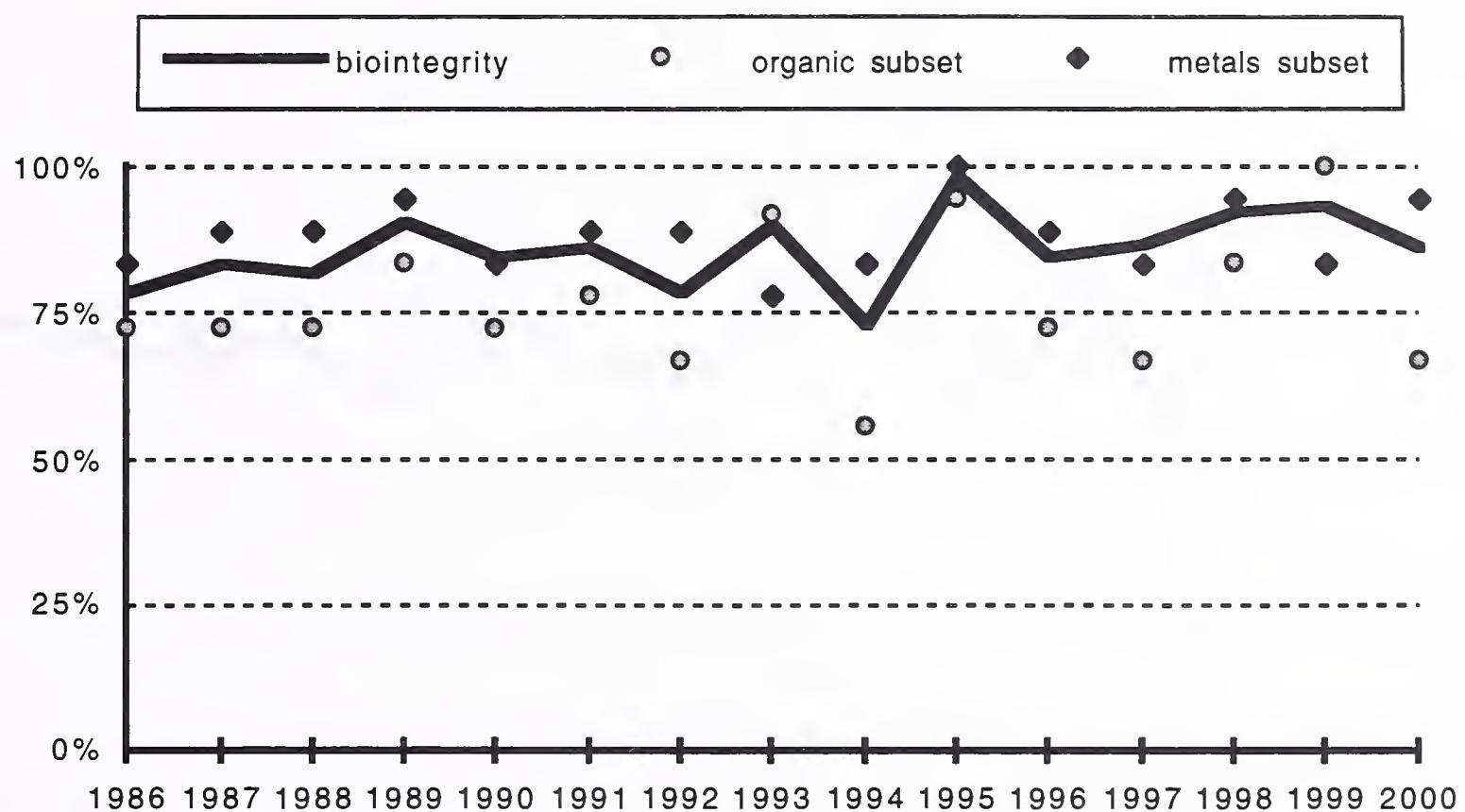


Figure 30. Biointegrity (%) in the Clark Fork River at Harper Bridge (station 20), 1986-2000.

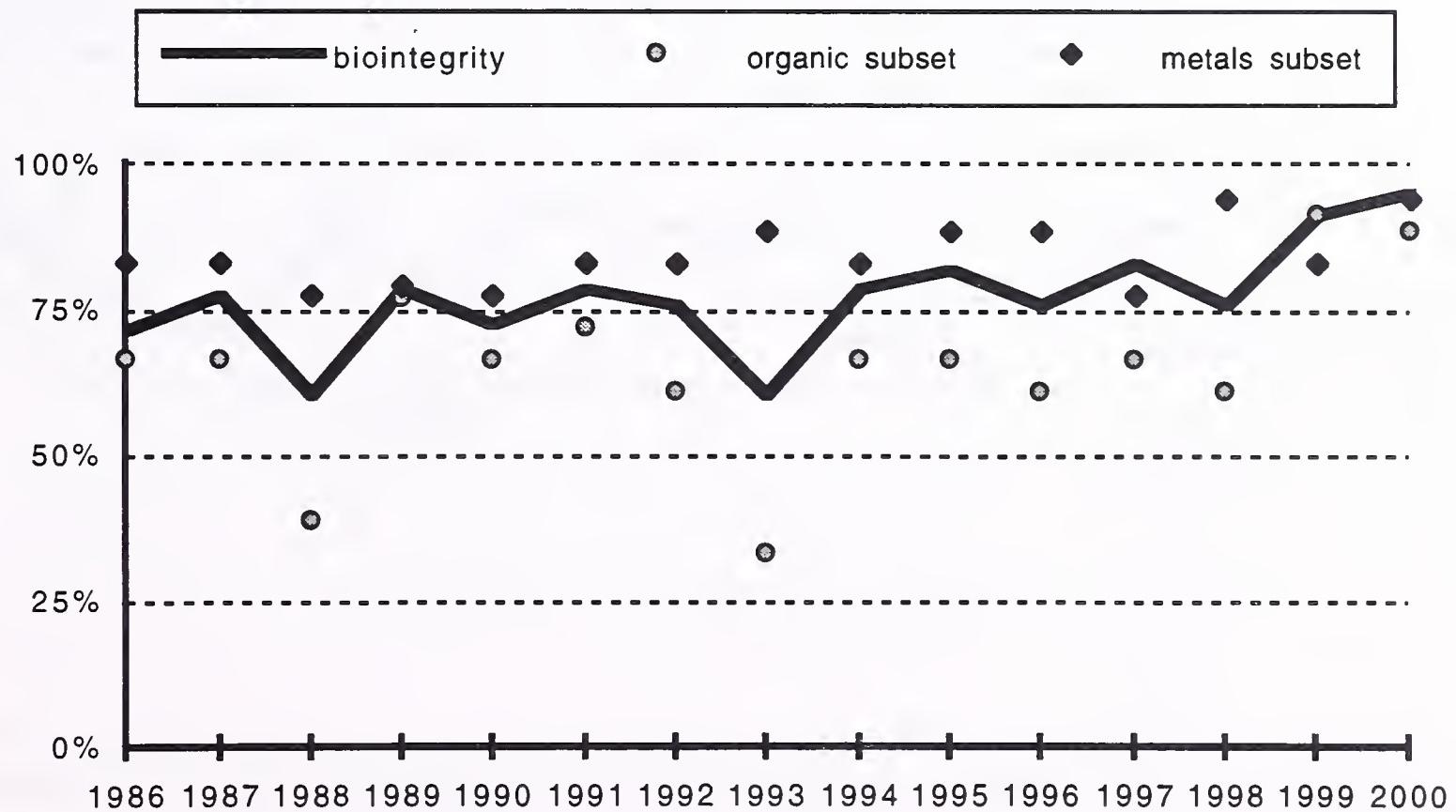


Figure 31. Biointegrity (%) in the Clark Fork River at Huson (station 22), 1986-1999.

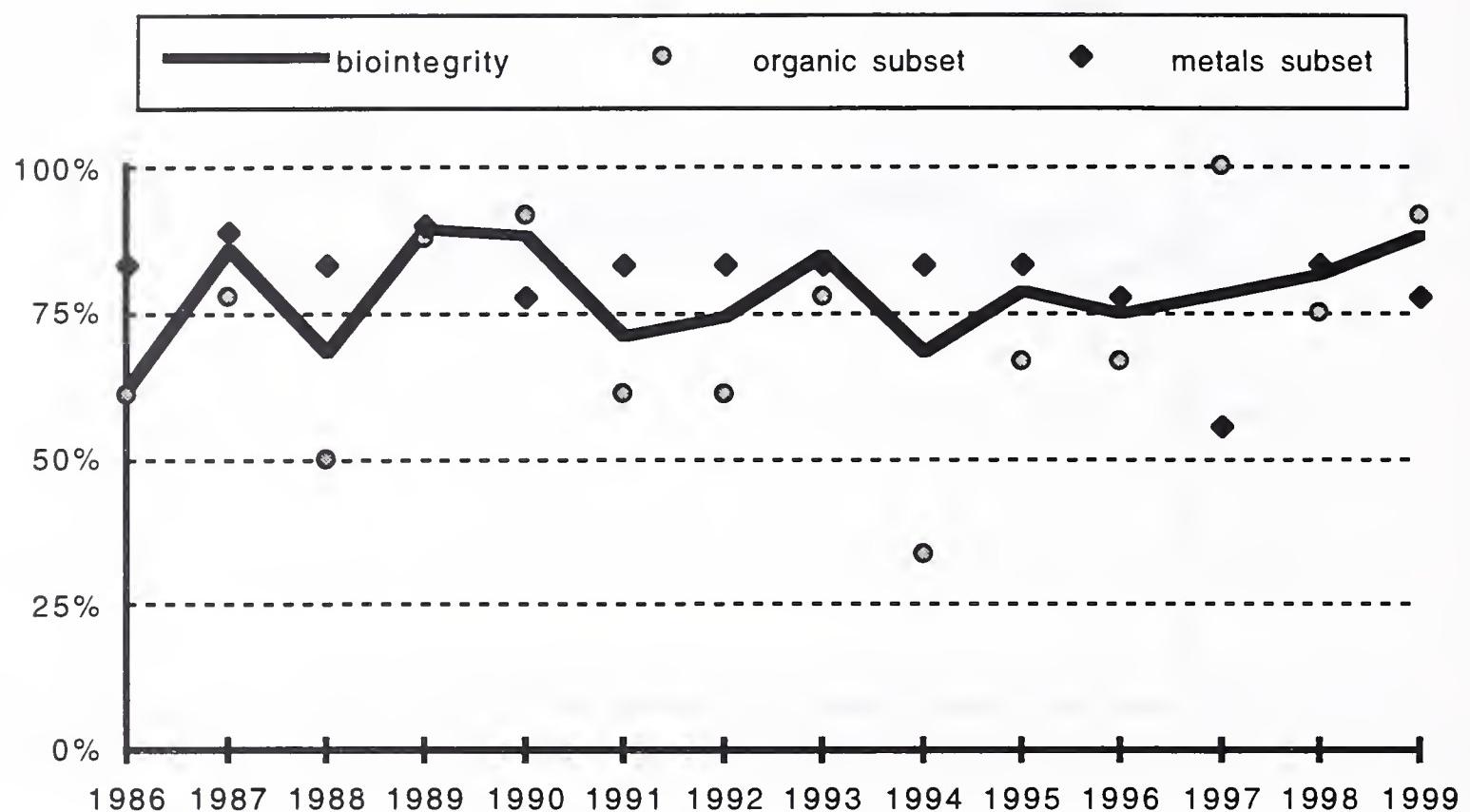


Figure 32. Biointegrity (%) in the Clark Fork River at Superior (station 24), 1986-2000.

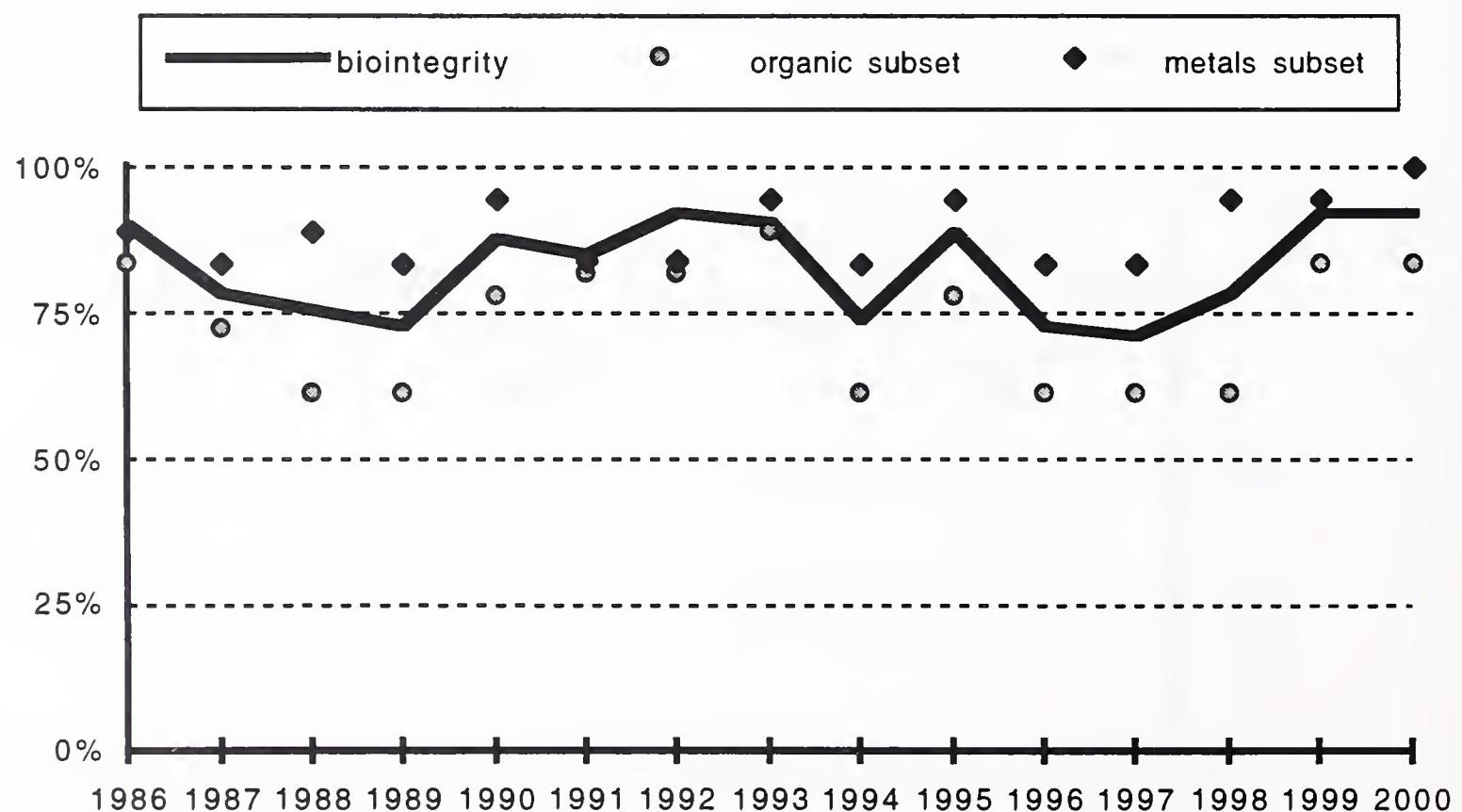


Figure 33. Biointegrity (%) in the Clark Fork River above the Flathead River (station 25), 1986-2000.

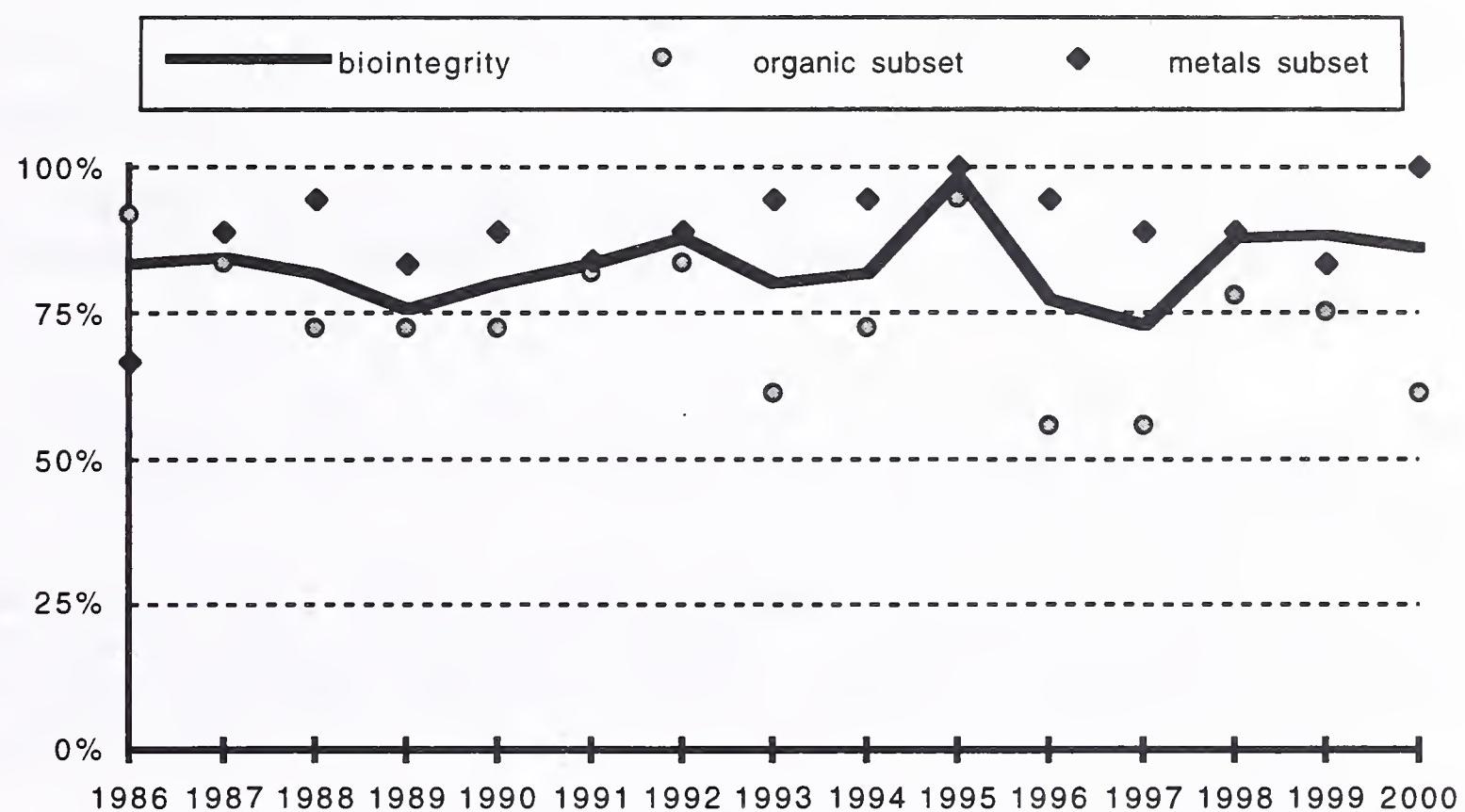
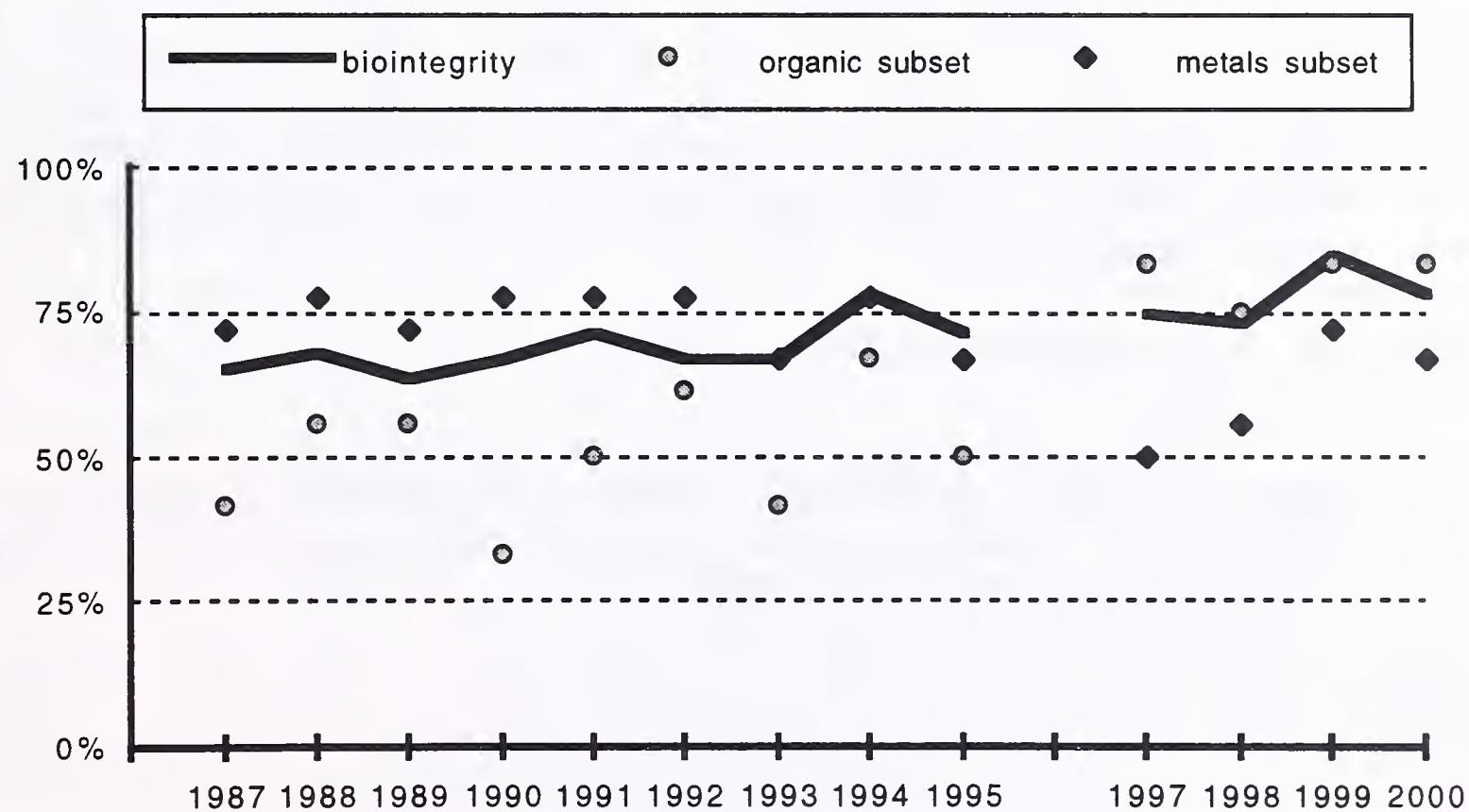


Figure 34. Biointegrity (%) in the Clark Fork River above Thompson Falls Reservoir (station 27), 1987-2000.



5. CONCLUSIONS

5.1 2000 Monitoring

1. For the second year in a row, the majority of monitoring stations were classified as nonimpaired. Macroinvertebrate-based bioassessments indicated no significant water quality problems at 15 Clark Fork River Basin sites during 2000. However, pollution was indicated at 11 monitoring stations.
2. For the first since monitoring began in 1986, no significant metals impacts were indicated downstream from the Warm Springs Ponds or in the Clark Fork mainstem.
3. Upper Silver Bow Creek remained severely impaired by metals and nutrient/organic pollution. Increased biological diversity was evident at the old Colorado Tailings site for the forth consecutive year. Severe organic pollution was indicated at Rocker, downstream from the Butte WWTP.
4. Impacts in the remainder of the study area were primarily attributable to nutrient and or organic pollution. Slight biological impairment was indicated in Silver Bow Creek below the Warm Springs Ponds and in the Clark Fork River at Deer Lodge, above the confluence of the Little Blackfoot River, and at Bearmouth. The Clark Fork River at Bonita was moderately impaired. Degraded riparian habitat and excessive sediment loads contributed to biological impairment and accentuated nutrient/organic pollution at these sites. Further downstream, the Clark Fork was slightly impaired below Missoula and above the confluence of the Flathead River. Slight biological impairment was also indicated in the lower Bitterroot River.

5.2 Long-term Monitoring

1. Nutrient and organic pollution are pervasive in the Clark Fork River and cause slight to moderate biological impairment through much of the study area. However, fewer stations were diagnosed as impaired by nutrients during 1999 and 2000.

2. Upper Silver Bow Creek was severely impaired by metals, nutrients, and organic pollutants throughout the 15-year monitoring period. Metals were clearly the most deleterious pollutants in this reach. However, moderate to severe organic pollution was indicated downstream from the Butte WWTP.
3. Within the Clark Fork mainstem, the reach from Deer Lodge to the Little Blackfoot River (CFR1) currently has the lowest biological integrity. Moderate impairment in this reach was due to the combined effects of nutrients, metals, and sediment pollution.
4. Biological integrity has improved in much of the upper Clark Fork River Basin in recent years. Significant trends of improving biointegrity were evident at Silver Bow Creek sites above the Butte WWTP and below the Warm Springs Ponds, in Warm Springs Creek, and at stations on the Clark Fork River from Warm Springs Creek downstream to Dempsey. Improved biointegrity at these sites was primarily attributable to reduced metals pollution.
5. Metals impacts have been significantly reduced in the upper Clark Fork River since the early 1990's. Prior to 1992, most sites in the upper 100 miles of the river were routinely impaired by metals pollution. Containment, treatment, and removal of metals sources in Silver Bow Creek, Warm Springs Creek, and the Willow-Willow Bypass has greatly reduced metals related impacts in the upper Clark Fork River.
6. Since 1993, metals pollution in the Clark Fork River has generally been limited to the lower Deer Lodge Valley (CFR1). Deleterious effects to the benthic macroinvertebrate community were generally slight. However, metals pollution was more widespread in the upper Clark Fork River during 1997 than at any time since 1986. Metals-related impacts were evident from Deer Lodge to Turah and caused moderate biological impairment in the lower Deer Lodge Valley. Increased metals pollution was attributed to increased metals loading associated with higher flows.
7. Recent temporal and spacial impairment patterns suggest the principle remaining source of metals is mine tailings stored in the Clark Fork's historic floodplain. These sources are diffuse and dispersed over a relatively large area. The extent and severity of metals-related impacts appears to be influenced the amount of bank erosion and overland runoff which are clearly related to streamflow. Impacts are most readily apparent in the lower Deer Lodge Valley (CFR1).

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APPENDIX A:

Macroinvertebrate checklist for the Clark Fork Basin
with biotic and metals tolerance values

Appendix A. Aquatic macroinvertebrates collected from the Clark Fork River Basin during August, 1986-2000 and tolerance values used to calculate biotic and metals tolerance indices.

class	order	family	genus	species	biotic index	metals tolerance
INSECTA						
Coleoptera						
		Dytiscidae				7
			<i>Agabates</i>	<i>sp.</i>		
			<i>Agabinus</i>	<i>sp.</i>		
			<i>Agabus</i>	<i>sp.</i>		
			<i>Deronectes</i>	<i>sp.</i>		
			<i>Hydroporus</i>	<i>sp.</i>		
			<i>Hydrovatus</i>	<i>sp.</i>		
			<i>Hygrotus</i>	<i>sp.</i>		
			<i>Ilybius</i>	<i>sp.</i>		
			<i>Oreodytes</i>	<i>spp.</i>		
		Elmidae				
			<i>Cleptelmis ornata</i>		4	4
			<i>Dubiraphia</i>	<i>sp.</i>	6	4
			<i>Heterlimnius</i>	<i>corpulentus</i>	3	3
			<i>Lara avara</i>		1	1
			<i>Microcylloepus</i>	<i>sp.</i>	5	4
			<i>Narpus concolor</i>		2	1
			<i>Optioservus</i>	<i>spp.</i>	5	5
			<i>Ordobrevia</i>	<i>sp.</i>	5	3
			<i>Stenelmis</i>	<i>sp.</i>	5	3
			<i>Zaitzevia parvula</i>		4	3
		Haliplidae			5	7
			<i>Brychius</i>	<i>sp.</i>		
			<i>Haliplus</i>	<i>sp.</i>		
			<i>Peltodytes</i>	<i>sp.</i>		
		Hydrophilidae				7
		Plecoptera				
			Capniidae		1	0
			Chloroperlidae			
				<i>Chloroperlinae</i>	1	2
				<i>Kathroperla perdita</i>	1	2
			Nemouridae			
				<i>Amphinemura</i>	2	1
				<i>Zapada cinctipes</i>	3	3
				<i>Zapada oregonensis</i>	2	2
				<i>Malenka</i>	1	1
		Perlidae				
				<i>Calineuria californica</i>	2	3
				<i>Claassenia sabulosa</i>	3	3
				<i>Doroneuria</i>	1	3
				<i>Hesperoperla pacifica</i>	1	3

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
Plecoptera (continued)						
Periodidae						
			<i>Cultus</i> sp.		2	2
			<i>Isoperla fulva</i>		2	3
			<i>Isoperla quinquepunctata</i>		2	2
			<i>Isogenoides</i> sp.		3	2
			<i>Skwala</i> sp.		3	3
Pteronarcidae						
			<i>Pteronarcella badia</i>		3	4
			<i>Pteronarcys californica</i>		2	1
Taeniopterygidae						
					2	1
Diptera						
Chironomidae						
			Tanypodinae			
			<i>Ablabesmyia</i> sp.		8	3
			<i>Alotanypus= Radotanypus</i> sp.		6	8
			<i>Brundiniella</i> sp.		3	7
			<i>Macropelopia</i> sp.		6	5
			<i>Nilotanypus</i> sp.		6	3
			<i>Thienemannimyia</i> gp.		5	3
			<i>Pentaneura</i> sp.		6	2
			<i>Procladius</i> sp.		9	5
			Diamesinae			
			<i>Diamesa</i> sp.		5	9
			<i>Pagastia</i> sp.		1	9
			<i>Potthastia gaedii</i> gp.		2	5
			<i>P. longimanus</i> gp.		2	5
			<i>Sympotthastia</i> sp.		2	4
			Prodiamesinae			
			<i>Monodiamesa</i> sp.		7	5
			<i>Odontomesa</i> sp.		4	5
			<i>Prodiamesa</i> sp.		3	3
			Orthocladiinae			
			<i>Brillia</i> sp.		4	4
			<i>Cardiocladus</i> spp.		5	9
			<i>Corynoneura</i> sp.		7	4
			<i>Cricotopus</i> spp.		7	10
			<i>C. (Nostococladus) sp.</i>		6	5
			<i>Eukiefferiella</i> spp.		8	9
			<i>E. (devonica) gp.</i>		8	7
			<i>Nanocladius</i> sp.		3	4
			<i>Orthocladius</i> spp.		6	5
			<i>Parametriocnemus</i> sp.		5	4
			<i>Paraphaenocladius</i> sp.		4	4
			<i>Rheocricotopus</i> sp.		4	5
			<i>Symbiocladius</i> sp.		4	1

Appendix A. continued.

class	order	family	genus	species	biotic index	metals	tolerance
Diptera (continued)							
			<i>Synorthocladius</i> sp.		2		1
			<i>Tvetenia</i> sp.		5		4
Chironominae							
		Chironomini					
			<i>Chironomus</i> sp.		10		7
			<i>Cryptochironomus</i> sp.		8		5
			<i>Demicryptochironomus</i> sp.		8		4
			<i>Dicrotendipes</i> sp.		8		5
			<i>Endochironomus</i> sp.		10		6
			<i>Glyptotendipes</i> sp.		10		4
			<i>Microtendipes</i> sp		6		4
			<i>Parachironomus</i> sp.		10		4
			<i>Paracladopelma</i> sp.		7		4
			<i>Phaenopsectra</i> sp		7		4
			<i>Polypedilum</i> spp.		6		4
			<i>Psuedochironomus</i> sp.		5		4
			<i>Robackia</i> sp.		7		4
			<i>Stenochironomus</i> sp.		5		4
			<i>Stictochironomus</i> sp.		5		4
			<i>Xenochironomus</i> sp.		4		0
		Tanytarsini					
			<i>Cladotanytarsus</i> sp.		7		3
			<i>Krenopsectra</i> sp.		4		1
			<i>Micropsectra</i> spp.		4		1
			<i>Paratanytarsus</i> sp.		6		3
			<i>Stempellina</i> sp.		2		0
			<i>Sublettia</i> sp.		2		0
			<i>Rheotanytarsus</i> sp.		6		1
			<i>Tanytarsus</i> sp.		6		3
		Tipulidae					
			<i>Antocha</i> sp.		3		4
			<i>Dicranota</i> sp.		3		2
			<i>Hesperoconpa</i> sp.		1		1
			<i>Hexatoma</i> sp.		2		2
			<i>Limnonia</i> (?) sp.		3		2
			<i>Limnephila</i> sp.		3		3
			<i>Ormosia</i> (?) sp.		6		3
			<i>Tipula</i> sp.		4		3
			<i>Rhabdomastix</i> sp.		1		1
		Athericidae					
			<i>Atherix pachypus</i>		4		4
		Simuliidae					
			<i>Simulium (Eusimulium)</i> spp.		5		5
			<i>Simulium (Psilozoa)</i> sp.		7		7

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
Diptera	(cont.)					
		Empididae				
			<i>Chelifera</i>	<i>sp.</i>	5	4
			<i>Clinocera</i>	<i>sp.</i>	5	4
			<i>Hemerodromia</i>	<i>sp.</i>	6	4
		Tanyteridae				
			<i>Protanyderus</i>	<i>sp.</i>	5	1
		Muscidae				
			<i>Limnophora</i>	<i>sp.</i>	6	7
		Ceratopogonidae				
			Certatopogoninae		6	4
		Culicidae				
			<i>Aedes</i>	<i>sp.</i>	7	5
		Dolichopodidae			4	4
		Tabanidae			6	3
		Stratiomyidae				
			<i>Euparyphus</i>	<i>sp.</i>	7	4
		Psychodidae				
			<i>Pericoma</i>	<i>sp.</i>	4	4
Hemiptera						
		Corixidae				5
			<i>Hesperocorixa</i>	<i>laevigata</i>		
			<i>Sigara</i>	<i>sp.</i>		
		Saldidae				
			<i>Salda</i>	<i>sp.</i>		
Lepidoptera						
		Pyralidae				
			<i>Petrophila</i>	<i>sp.</i>	5	3
Megaloptera						
		Sialidae				
			<i>Sialis</i>	<i>sp.</i>	4	4
Odonata						
		Gomphidae				
			<i>Ophiogomphus</i>	<i>sp.</i>	5	4
		Ceonagrionidae				
			<i>Ischnura</i>	<i>sp.</i>	8	4
Ephemeroptera						
		Baetidae				
			<i>Acentrella</i>	<i>insignicans</i>	4	4
			<i>A.</i>	<i>turbida</i>	4	3
			<i>Baetis</i>	<i>punctiventris</i> (<i>Psuedocloeon</i>)	6	3
			<i>B.</i>	<i>tricaudatus</i>	4	5
			<i>Callibaetis</i>	<i>sp.</i>	9	1
			<i>Centroptilum</i>	<i>sp.</i>	2	1
			<i>Diphetor</i>	<i>hageni</i>	5	1

Appendix A. continued.

class	order	family	genus	species	biotic index	metals	tolerance
Ephemeroptera (cont)							
Ephemerellidae							
			<i>Attenella</i>	<i>margarita</i>	3	1	
			<i>Caudatella</i>	<i>heterocaudata</i>	0	0	
			<i>C.</i>	<i>hystrix</i>	0	0	
			<i>Drunella</i>	<i>coloradensis</i>	0	0	
			<i>D.</i>	<i>doddsi</i>	1	0	
			<i>D.</i>	<i>grandis</i>	2	1	
			<i>Ephemerella</i>	<i>inermis</i>	4	3	
			<i>Serratella</i>	<i>tibialis</i>	2	1	
			<i>Timpanoga</i>	<i>hecuba</i>	2	1	
Heptageniidae							
			<i>Cinygmulia</i>	<i>sp.</i>	0	0	
			<i>Epeorus</i>	<i>spp.</i>	2	0	
			<i>E.</i>	<i>albertae</i>	2	0	
			<i>E.</i>	<i>grandis</i>	0	0	
			<i>E.</i>	<i>longimanus</i>	1	0	
			<i>Heptagenia</i>	<i>soltari</i>	3	1	
			<i>Nixe</i>	<i>spp.</i>	4	1	
			<i>Rhithrogena</i>	<i>spp.</i>	0	2	
			<i>Stenonema</i>	<i>(termintum)?</i>	4	1	
Leptophlebiidae							
			<i>Paraleptophlebia</i>	<i>spp.</i>	1	1	
			<i>P.</i>	<i>bicornuta</i>	2	1	
			<i>P.</i>	<i>debilis</i>	1	1	
Siphlonuridae							
			<i>Ameletus</i>	<i>sp.</i>	0	1	
Tricorythidae							
			<i>Tricorythodes</i>	<i>minutus</i>	4	4	
Trichoptera							
Brachycentridae							
			<i>Amiocentrus</i>	<i>aspilus</i>	3	1	
			<i>Brachycentrus</i>	<i>americanus</i>	1	4	
			<i>Brachycentrus</i>	<i>occidentalis</i>	2	3	
			<i>Micrasema</i>	<i>bactro</i>	1	2	
Glossosomatidae							
			<i>Agapetus</i>	<i>sp.</i>	0	2	
			<i>Glossosoma</i>	<i>sp.</i>	0	2	
			<i>Protoptila</i>	<i>sp.</i>	1	2	
Helicopsycidae							
			<i>Helicopsyche</i>	<i>borealis.</i>	3	3	
Hydropsychidae							
			<i>Arctopsyche</i>	<i>grandis</i>	2	3	
			<i>Cheumatopsyche</i>	<i>spp.</i>	5	5	
			<i>Hydropsyche</i>	<i>spp.</i>	5	5	
			<i>H. (H.)</i>	<i>occidentalis</i>	5	5	
			<i>H. (Ceratopsyche)</i>	<i>spp.</i>	5	5	

Appendix A. continued.

class	order	family	genus	species	biotic index	metals	tolerance
Trichoptera (continued)							
			<i>H.(C.) cockerelli</i>		4		4
			<i>H. (C.) morosa?</i>		6		5
			<i>H. (C.) oslari/tana</i>		3		6
			<i>H. (C.) slossonae</i>		4		6
Hydroptilidae							
			<i>Hydroptila spp.</i>		6		4
			<i>Leucotrichia pictipes</i>		2		1
			<i>Neotrichia sp.</i>		2		2
			<i>Ochrotrichia sp.</i>		4		3
			<i>Oxyethira sp.</i>		3		2
			<i>Zumatrixchia notosa</i>		3		1
Lepidostomatidae							
			<i>Lepidostoma sp.</i>		1		1
Leptoceridae							
			<i>Ceraclea spp.</i>		3		1
			<i>Oecetis sp.</i>		8		3
			<i>Nectopsyche sp.</i>		3		3
			<i>Trianodes sp.</i>		6		1
Limnephilidae							
			<i>Dicosmoecus sp.</i>		2		1
			<i>Ecclisomyia sp.</i>		4		2
			<i>Limnephilus sp.</i>		3		2
			<i>Onocosmoecus sp.</i>		3		2
			<i>Neophylax sp.</i>		3		2
			<i>Psychoglypha sp.</i>		0		2
Philopotamidae							
			<i>Wormaldia sp.</i>		0		1
Phryageneaidae							
			<i>Phryagenea sp.</i>		4		?
Polycentropididae							
			<i>Polycentropus sp.</i>		6		1
Psychomyiidae							
			<i>Psychomyia sp.</i>		2		1
Rhyacophilidae							
			<i>Rhyacophila angelita gp.</i>		0		1
			<i>R. coloradensis gp.</i>		0		1
			<i>R. brunnea gp.</i>		2		1
ANNELIDA							
Oligochaeta							
			Enchytraeidae		4		1
			Lumbricidae		4		1
			Lumbriculidae		4		1
			Naididae		8		5
			Tubificidae		10		6

Appendix A. concluded.

class	order	family	genus	species	biotic index	metals	tolerance
		Hirudinea					
		Erpobdellidae			8	4	
		Glossophoniidae			9	4	
			<i>Glossiphonia complanata</i>		9	4	
			<i>Helobdella stagnalis</i>		10	4	
CRUSTACEA							
		Amphipoda					
		Gammaridae					
			<i>Gammarus</i> sp.		4	1	
		Talitridae					
			<i>Hyalella azteca</i>		8	3	
		Isopoda					
		Asellidae					
			<i>Caecidotea</i> sp. (<i>Asellus</i>)		8	5	
Decapoda							
		Astacidae					
			<i>Pacifasticus</i> sp.		6	3	
MOLLUSCA							
		Gastropoda					
		Ancyclidae					
			<i>Ferrissia rivularis</i>		6	1	
		Lymnaeidae					
			<i>Fossaria</i> spp.		6	3	
			<i>Stagnicola</i> sp.		6	3	
			<i>Fisherola nutalli</i>		3	1	
			<i>Radix auricularia</i>		8	1	
		Physidae					
			<i>Physella</i> sp.		8	4	
		Planorbidae					
			<i>Gyraulus</i> sp.		8	3	
		Valvatidae					
			<i>Valvata humeralis</i>		3	1	
		Pelecypoda					
		Sphaeriidae					
			<i>Shaerium</i> sp.		8	3	
			<i>Pisidium</i> sp.		8	3	
TURBELLARIA					4	3	
NEMATODA					5	5	
NEMATOMORPHA					5	5	
PORIFERA					0	0	
ACARI					5	5	
CNIDARIA			<i>Hydra</i> sp.		8	3	

APPENDIX B:
2000 Clark Fork Basin macroinvertebrate data

B.1 MACROINVERTEBRATE DATA								
Blacktail CREEK above Grove Gulch - STATION SF-1 -19 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						41%	593	
<i>Optioservus</i> spp.	130	198	453	402	1183	21%	295.8	156.0
<i>Zaitzevia</i> sp.	31	55	61	37	184	3%	46.0	14.3
<i>Cleptelmis ornata</i>	44	96	437	266	843	15%	210.8	178.2
<i>Narpus concolor</i>	3	0	0	0	3	0%	0.8	1.5
<i>Brychius</i> sp.	15	123	3	17	158	3%	39.5	56.0
<i>Oreodytes</i> spp.	1	0	0	0	1	0%	0.3	0.5
DIPTERA						19%	272	
<i>Radotanypus</i> sp.	5	0	0	0	5	0%	1.3	2.5
<i>Thienemannimyia</i> gp.	4	0	0	0	4	0%	1.0	2.0
<i>Pagastia</i> sp	72	63	65	199	399	7%	99.8	66.3
<i>Cricotopus</i> spp.	10	22	15	20	67	1%	16.8	5.4
<i>Eukiefferiella</i> spp.	0	0	24	11	35	1%	8.8	11.4
<i>Orthocladius</i> spp.	22	51	47	45	165	3%	41.3	13.1
<i>Parametriocnemus</i> sp.	6	37	1	10	54	1%	13.5	16.1
<i>Rheocricotopus</i> sp.	1	0	0	1	2	0%	0.5	0.6
<i>Thienemanniella</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	0	1	22	6	29	1%	7.3	10.2
<i>Microtendipes</i> sp	0	1	0	0	1	0%	0.3	0.5
<i>Phaenopsectra</i> sp	4	0	0	0	4	0%	1.0	2.0
<i>Rheotanytarsus</i> sp.	0	2	3	2	7	0%	1.8	1.3
<i>Tanytarsus</i> sp.	11	2	0	1	14	0%	3.5	5.1
<i>Micropsectra</i> spp.	9	3	12	35	59	1%	14.8	14.0
<i>Dicranota</i> sp.	1	9	11	7	28	0%	7.0	4.3
<i>Hexatoma</i> sp.	1	21	20	12	54	1%	13.5	9.3
<i>Tipula</i> sp.	0	1	0	2	3	0%	0.8	1.0
<i>Atherix pachypus</i>	1	0	0	0	1	0%	0.3	0.5
<i>Simulium</i> spp.	7	0	81	20	108	2%	27.0	36.9
<i>Limnophora</i> sp.	4	2	0	0	6	0%	1.5	1.9
<i>Chelifera</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Pericoma</i> sp.	0	12	9	21	42	1%	10.5	8.7
EPHEMEROPTERA						5%	74	
<i>Baetis tricaudatus</i>	4	0	140	93	237	4%	59.3	68.9
<i>Diphetor hageni</i>	8	2	3	13	26	0%	6.5	5.1
<i>Ephemerella inermis</i>	2	0	0	1	3	0%	0.8	1.0
<i>Nixe</i> sp.	0	5	2	10	17	0%	4.3	4.3
<i>Paraleptophlebia</i> sp.	0	5	0	7	12	0%	3.0	3.6
<i>Tricorythodes minutus</i>	0	0	1	0	1	0%	0.3	0.5
PLECOPTERA						15%	213	
<i>Capniidae</i>	0	0	0	1	1	0%	0.3	0.5
<i>Malenka</i> sp.	0	3	13	2	18	0%	4.5	5.8

B.1 MACROINVERTEBRATE DATA								
Blacktail CREEK above Grove Gulch - STATION SF-1 -19 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
<i>Skwala</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Isoperla</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Pteronarcella badia</i>	30	35	363	273	701	12%	175.3	168.9
Chloroperlinae	14	32	28	53	127	2%	31.8	16.1
TRICHOPTERA								19% 269
<i>Cheumatopsyche</i> spp.	0	0	2	1	3	0%	0.8	1.0
<i>Hydropsyche (C) cockerelli</i>	1	1	0	0	2	0%	0.5	0.6
<i>Hydropsyche (C) nr. morosa</i>	2	0	0	0	2	0%	0.5	1.0
<i>Hydropsyche oslari</i> ?	45	34	439	468	986	17%	246.5	239.4
<i>Neophylax</i> sp.	0	1	1	0	2	0%	0.5	0.6
<i>Hydroptila</i> spp.	1	0	0	15	16	0%	4.0	7.3
<i>Lepidostoma</i> sp.	22	12	1	23	58	1%	14.5	10.3
<i>Amiocentrus</i> sp.	3	0	0	0	3	0%	0.8	1.5
<i>Brachycentrus americanus</i>	1	0	0	0	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	0	1	0	0	1	0%	0.3	0.5
ANNELIDA								1% 10
Naididae	7	0	12	20	39	1%	9.8	8.4
Tubificidae	0	0	0	1	1	0%	0.3	0.5
CRUSTACEA								
<i>Hyalella azteca</i>	0	1	0	0	1	0%	0.3	0.5
MOLLUSCA								0% 4
<i>Physella</i> sp.	1	6	0	0	7	0%	1.8	2.9
<i>Gyraulus</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Fossaria</i> sp.	1	1	0	0	2	0%	0.5	0.6
<i>Pisidium</i> sp.	0	3	1	1	5	0%	1.3	1.3
ID's by D. McGuire								
TOTAL ORGANISMS	525	843	2272	2097	5737		1434	879
TAXA RICHNESS	37	35	31	36	58		34.8	2.6
SHAN. DIVERSITY	3.91	3.73	3.23	3.47	3.67		3.58	0.30
BIOTIC INDEX	3.88	4.14	3.89	3.61	3.82		3.88	0.21
EPT RICHNESS	12	11	13	14	22		12.5	1.3
% R.A. DOMINANT	25%	23%	20%	22%	21%		23%	2.1%
% R.A. FILTERERS	11%	5%	23%	23%	19%		15%	9%
METALS TOLERANCE	5.16	5.09	4.90	5.12	5.03		5.07	0.11
Baetidae/Ephemeroptera	0.86	0.17	0.98	0.85	0.89		0.71	0.37
Hydropsychinae/Trichoptera	0.64	0.71	1.00	0.93	0.92		0.82	0.17
EPT / (EPT + CHIR.)	0.48	0.42	0.84	0.74	0.72		0.62	0.20
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	40%	41%	42%	34%	39%		39%	4%
SEDIMENT TOLERANT INDEX	7.07	7.29	6.70	6.68	6.81		6.93	0.29
FSBI	75	58	61	60	111		63.5	7.8

B.2 MACROINVERTEBRATE DATA								
SILVER BOW CREEK above Butte WWTP - STATION 00 - 19 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	38	
<i>Optioservus spp.</i>	10	35	24	6	75	3%	18.8	13.3
<i>Zaitzevia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Heterlimnius sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cleptelmis ornata</i>	8	7	0	32	47	2%	11.8	14.0
<i>Agabus sp.</i>	3	4	2	16	25	1%	6.3	6.6
<i>Brychius sp.</i>	0	2	0	1	3	0%	0.8	1.0
DIPTERA						80%	568	
<i>Radotanypus sp.</i>	6	0	0	0	6	0%	1.5	3.0
<i>Thienemannimyia gp.</i>	3	8	3	2	16	1%	4.0	2.7
<i>Pagastia sp</i>	28	27	44	7	106	4%	26.5	15.2
<i>Cardiocladius spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	509	624	248	330	1711	61%	427.8	170.3
<i>Eukiefferiella spp.</i>	4	14	10	4	32	1%	8.0	4.9
<i>Orthocladius spp.</i>	106	6	6	1	119	4%	29.8	50.9
<i>Rheocricotopus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Microtendipes sp</i>	10	5	0	1	16	1%	4.0	4.5
<i>Phaenopsectra sp</i>	133	6	8	1	148	5%	37.0	64.1
<i>Psuedochironomus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tanytarsus sp.</i>	8	5	1	0	14	0%	3.5	3.7
<i>Antocha sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Dicranota sp.</i>	0	17	3	5	25	1%	6.3	7.5
<i>Tipula sp.</i>	1	5	10	6	22	1%	5.5	3.7
<i>Simulium spp.</i>	3	3	2	2	10	0%	2.5	0.6
<i>Limnophora sp.</i>	7	15	2	16	40	1%	10.0	6.7
EPHEMEROPTERA						0%	1	
<i>Baetis punctiventris</i>	2	0	0	0	2	0%	0.5	1.0
PLECOPTERA						0%	0	
<i>Skwala sp.</i>	0	1	0	0	1	0%	0.3	0.5

B.2 MACROINVERTEBRATE DATA								
SILVER BOW CREEK above Butte WWTP - STATION 00 - 19 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						12%	82	
<i>Cheumatopsyche</i> spp.	0	3	2	0	5	0%	1.3	1.5
<i>Hydropsyche occidentalis</i>	2	11	1	1	15	1%	3.8	4.9
<i>Hydropsyche oslari</i> ?	11	107	27	54	199	7%	49.8	42.1
<i>Hydropsyche slossonae</i>	3	19	5	6	33	1%	8.3	7.3
<i>Hydroptila</i> spp.	1	0	0	2	3	0%	0.8	1.0
<i>Phryagenea</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Brachycentrus americanus</i>	1	3	3	1	8	0%	2.0	1.2
<i>Brachycentrus occidentalis</i>	9	34	15	6	64	2%	16.0	12.6
ANNELIDA						2%	17	
Tubificidae	17	24	13	11	65	2%	16.3	5.7
Erpobdellidae	0	0	0	0	0	0%	0.0	0.0
<i>Hellobdella stagnalis</i>	1	0	0	0	1	0%	0.3	0.5
MOLLUSCA						0%	1	
<i>Gyraulus</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Fossaria</i> sp.	2	1	0	1	4	0%	1.0	0.8
ID's by D. McGuire								
TOTAL ORGANISMS	892	987	435	513	2827		707	273
TAXA RICHNESS	29	26	24	24	41		25.8	2.4
SHAN. DIVERSITY	2.31	2.31	2.55	2.17	2.54		2.34	0.16
BIOTIC INDEX	6.52	5.95	5.69	6.04	6.11		6.05	0.35
EPT RICHNESS	8	7	6	6	10		6.8	1.0
% R.A. DOMINANT	57%	63%	57%	64%	61%		60%	3.9%
% R.A. FILTERERS	3%	18%	13%	14%	12%		12%	6%
METALS TOLERANCE	7.72	8.35	8.28	8.41	8.15		8.19	0.32
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera	0.57	0.79	0.66	0.87	0.77		0.72	0.13
EPT / (EPT + CHIR.)	0.04	0.20	0.14	0.17	0.13		0.14	0.07
Experimental Sediment Metrics								
% SAND TOLERANT	2%	5%	6%	7%	5%		5%	2%
SEDIMENT TOLERANT INDEX	8.08	7.42	7.56	7.58	7.68		7.66	0.29
FSBI	46	51	52	44	71		48	3.9

B.3 MACROINVERTEBRATE DATA								
SILVER BOW CREEK below Colorado Tailings - STATION 01 - 18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						0%	0	
<i>Optioservus spp.</i>	0	1	0	0	1	0%	0.3	0.5
DIPTERA						97%	713	
<i>Radotanypus sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Thienemannimyia gp.</i>	4	24	2	2	32	1%	8.0	10.7
<i>Pagastia sp</i>	1	0	1	0	2	0%	0.5	0.6
<i>Potthastia spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	1	1	1	0	3	0%	0.8	0.5
<i>Cricotopus spp.</i>	89	295	56	31	471	16%	117.8	120.5
<i>Eukiefferiella spp.</i>	2	14	3	0	19	1%	4.8	6.3
<i>Orthocladius spp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Parametriocnemus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Chironomus sp.</i>	2	13	1	3	19	1%	4.8	5.6
<i>Dicrotendipes sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Glyptotendipes sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Phaenopsectra sp</i>	39	121	25	10	195	7%	48.8	49.6
<i>Ceratopogoninae</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	318	1200	308	273	2099	71%	524.8	450.6
<i>Limnophora sp.</i>	1	1	1	0	3	0%	0.8	0.5
ANNELIDA						3%	25	
Tubificidae	17	32	16	34	99	3%	24.8	9.6
ID's by D. McGuire								
TOTAL ORGANISMS	476	1705	415	357	2953		738	646
TAXA RICHNESS	12	13	11	10	18		11.5	1.3
SHAN. DIVERSITY	1.53	1.41	1.33	1.26	1.43		1.38	0.11
BIOTIC INDEX	7.08	7.06	7.10	7.28	7.09		7.13	0.10
EPT RICHNESS	0	0	0	0	0		0.0	0.0
% R.A. DOMINANT	67%	70%	74%	76%	71%		72%	4.3%
% R.A. FILTERERS	67%	70%	74%	76%	71%		72%	4%
METALS TOLERANCE	7.26	7.24	7.19	7.04	7.21		7.18	0.10
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera	1.00	1.00	1.00	1.00	1.00		1.00	0.00
EPT / (EPT + CHIR.)	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	0%	0%	0%	0%	0%		0%	0%
SEDIMENT TOLERANT INDEX	7.48	7.39	7.39	7.47	7.42		7.43	0.05
FSBI	3	6	3	3	6		3.8	1.5

B.4 MACROINVERTEBRATE DATA							
SILVER BOW CREEK at Opportunity - STATION 02.5 - 18 AUG 2000							
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN
COLEOPTERA						0%	1
<i>Optioservus</i> spp.	2	0	0	0	2	0%	0.5
DIPTERA					53%	227	
<i>Pagastia</i> sp.	52	20	39	51	162	9%	40.5
<i>Cardiocladius</i> spp.	52	32	10	9	103	6%	25.8
<i>Cricotopus</i> spp.	37	16	18	12	83	5%	20.8
<i>Eukiefferiella</i> spp.	41	13	8	6	68	4%	17.0
<i>Orthocladius</i> spp.	11	4	0	0	15	1%	3.8
<i>Thienemanniella</i> sp.	0	0	0	1	1	0%	0.3
<i>Tvetenia</i> sp.	1	0	0	0	1	0%	0.3
<i>Chironomus</i> sp.	0	1	0	1	2	0%	0.5
<i>Antocha</i> sp.	3	4	1	7	15	1%	3.8
<i>Dicranota</i> sp.	0	1	0	0	1	0%	0.3
<i>Simulium</i> (<i>Psilozoa</i>)	316	33	33	74	456	26%	114.0
<i>Chelifera</i> sp.	0	0	1	0	1	0%	0.3
ODONATA							
<i>Ophiogomphus</i> sp.	0	1	0	0	1	0%	0.3
TRICHOPTERA					47%	202	
<i>Cheumatopsyche</i> spp.	1	1	0	0	2	0%	0.5
<i>Hydropsyche occidentalis</i>	1	0	0	2	3	0%	0.8
<i>Hydropsyche (C) cockerelli</i>	1	0	0	0	1	0%	0.3
<i>Hydropsyche oslari</i> ?	46	48	9	30	133	8%	33.3
<i>Brachycentrus americanus</i>	181	410	38	39	668	39%	167.0
<i>Agapetus</i> sp.	2	0	0	0	2	0%	0.5
ANNELIDA					0%	1	
Tubificidae	0	0	2	1	3	0%	0.8
ID's by D. McGuire							
TOTAL ORGANISMS	747	584	159	233	1723	431	281
TAXA RICHNESS	15	13	10	12	21	12.5	2.1
SHAN. DIVERSITY	2.47	1.71	2.69	2.67	2.52	2.38	0.46
BIOTIC INDEX	4.73	2.12	3.80	4.00	3.66	3.66	1.10
EPT RICHNESS	6	3	2	3	6	3.5	1.7
% R.A. DOMINANT	42%	70%	25%	32%	39%	42%	20%
% R.A. FILTERERS	73%	84%	50%	62%	73%	67%	15%
METALS TOLERANCE	6.66	5.06	7.23	6.97	6.21	6.48	0.97
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Hydropsychinae/Trichoptera	0.21	0.11	0.19	0.45	0.17	0.24	0.15
EPT / (EPT + CHIR.)	0.54	0.84	0.39	0.47	0.65	0.56	0.20
Experimental Sediment Metrics							
% SEDIMENT TOLERANT	0%	0%	0%	0%	0%	0%	0%
SEDIMENT TOLERANT INDEX	6.15	4.16	6.43	6.33	5.52	5.77	1.08
FSBI	36	25	23	26	40	27.5	5.8

B.5 MACROINVERTEBRATE DATA								
SILVER BOW CREEK below Warm Springs Ponds - STATION 04.5 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						10%	297	
<i>Optioservus spp.</i>	468	148	120	346	1082	9%	270.5	165.7
<i>Zaitzevia sp.</i>	30	21	10	32	93	1%	23.3	10.0
<i>Cleptelmis ornata</i>	0	1	0	11	12	0%	3.0	5.4
DIPTERA						28%	823	
<i>Thienemannimyia gp.</i>	11	15	11	22	59	0%	14.8	5.2
<i>Pentaneura sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	11	1	0	32	44	0%	11.0	14.9
<i>Potthastia spp.</i>	5	5	0	0	10	0%	2.5	2.9
<i>Cardiocladius spp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	42	47	41	52	182	2%	45.5	5.1
<i>Eukiefferiella spp.</i>	0	5	0	0	5	0%	1.3	2.5
<i>Orthocladius spp.</i>	13	5	1	20	39	0%	9.8	8.5
<i>Parametriocnemus sp.</i>	15	5	1	10	31	0%	7.8	6.1
<i>Tvetenia sp.</i>	264	272	173	419	1128	9%	282.0	101.8
<i>Microtendipes sp</i>	257	190	162	376	985	8%	246.3	95.2
<i>Polypedilum spp.</i>	32	49	22	55	158	1%	39.5	15.2
<i>Tanytarsus sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Micropsectra spp.</i>	20	7	1	10	38	0%	9.5	7.9
<i>Antocha sp.</i>	6	5	3	5	19	0%	4.8	1.3
<i>Hexatoma sp.</i>	11	4	7	0	22	0%	5.5	4.7
<i>Tipula sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium spp.</i>	150	183	12	181	526	4%	131.5	81.1
<i>Limnophora sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hemerodromia sp.</i>	17	4	0	20	41	0%	10.3	9.7
EPHEMEROPTERA						5%	146	
<i>Acentrella insignificans</i>	0	3	0	0	3	0%	0.8	1.5
<i>Baetis tricaudatus</i>	30	72	26	153	281	2%	70.3	59.0
<i>Baetis punctiventris</i>	1	5	1	3	10	0%	2.5	1.9
<i>Diphetor hageni</i>	16	11	5	1	33	0%	8.3	6.6
<i>Attenella margarita</i>	1	0	0	1	2	0%	0.5	0.6
<i>Ephemerella inermis</i>	1	5	1	0	7	0%	1.8	2.2
<i>Paraleptophlebia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	66	84	61	34	245	2%	61.3	20.7
LEPIDOPTERA								
<i>Petrophila sp.</i>	6	16	38	11	71	1%	17.8	14.1

B.5 MACROINVERTEBRATE DATA

SILVER BOW CREEK below Warm Springs Ponds - STATION 04.5 -18 AUG 2000

B.5 MACROINVERTEBRATE DATA								
SILVER BOW CREEK below Warm Springs Ponds - STATION 04.5 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	3151	2609	2267	3903	11930		2983	713
TAXA RICHNESS	44	44	39	41	60		42.0	2.4
SHAN. DIVERSITY	3.61	3.81	3.49	3.51	3.71		3.60	0.15
BIOTIC INDEX	5.22	5.38	5.74	5.19	5.34		5.38	0.25
EPT RICHNESS	19	18	19	18	26		18.5	0.6
% R.A. DOMINANT	23%	23%	22%	30%	25%		24%	4.0%
% R.A. FILTERERS	45%	45%	38%	48%	45%		44%	4%
METALS TOLERANCE	4.59	4.54	4.19	4.65	4.52		4.49	0.21
Baetidae/Ephemeroptera	0.41	0.51	0.34	0.82	0.56		0.52	0.21
Hydropsychinae/Trichoptera	0.89	0.83	0.87	0.89	0.87		0.87	0.03
EPT / (EPT + CHIR.)	0.70	0.69	0.72	0.68	0.69		0.70	0.02
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	37%	24%	25%	24%	27%		27%	6%
SEDIMENT TOLERANT INDEX	6.92	6.75	7.04	6.68	6.83		6.85	0.16
FSBI	90	87	79	87	117		85.8	4.7

B.6 MACROINVERTEBRATE DATA								
MILL-WILLOW CREEKS bypass - STATION 05 - 18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						17%	240	
<i>Optioservus spp.</i>	167	148	321	196	832	15%	208.0	77.9
<i>Zaitzevia sp.</i>	23	37	49	14	123	2%	30.8	15.4
<i>Cleptelmis ornata</i>	0	0	0	0	0	0%	0.0	0.0
<i>Brychius sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Oreodytes spp.</i>	1	1	0	0	2	0%	0.5	0.6
DIPTERA						22%	309	
<i>Thienemannimyia gp.</i>	1	18	1	3	23	0%	5.8	8.2
<i>Pentaneura sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Procladius sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	0	0	7	1	8	0%	2.0	3.4
<i>Cricotopus spp.</i>	14	12	13	5	44	1%	11.0	4.1
<i>Cricotopus nostococladius</i>	0	1	5	4	10	0%	2.5	2.4
<i>Eukiefferiella spp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Orthocladius spp.</i>	11	2	32	1	46	1%	11.5	14.4
<i>Parametriocnemus sp.</i>	23	12	14	13	62	1%	15.5	5.1
<i>Tvetenia sp.</i>	167	33	171	48	419	8%	104.8	74.5
<i>Microtendipes sp</i>	17	171	78	79	345	6%	86.3	63.5
<i>Phaenopsectra sp</i>	0	1	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	1	0	1	1	3	0%	0.8	0.5
<i>Rheotanytarsus sp.</i>	0	1	6	1	8	0%	2.0	2.7
<i>Tanytarsus sp.</i>	0	12	0	2	14	0%	3.5	5.7
<i>Micropsectra spp.</i>	23	50	45	28	146	3%	36.5	13.0
<i>Antocha sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hexatoma sp.</i>	7	9	12	5	33	1%	8.3	3.0
<i>Tipula sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Atherix pachypus</i>	1	0	0	0	1	0%	0.3	0.5
<i>Simulium spp.</i>	33	3	28	2	66	1%	16.5	16.3
<i>Limnophora sp.</i>	2	0	0	0	2	0%	0.5	1.0
EPHEMEROPTERA						6%	78	
<i>Acentrella insignicans</i>	1	0	0	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	28	6	57	8	99	2%	24.8	23.7
<i>Baetis punctiventralis</i>	2	1	10	2	15	0%	3.8	4.2
<i>Centroptilum sp.</i>	0	0	6	0	6	0%	1.5	3.0
<i>Diphotor hageni</i>	5	27	23	16	71	1%	17.8	9.6
<i>Attenella margarita</i>	1	0	0	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Paraleptophlebia sp.</i>	6	37	8	7	58	1%	14.5	15.0
<i>Tricorythodes minutus</i>	6	27	11	14	58	1%	14.5	9.0

B.6 MACROINVERTEBRATE DATA							
MILL-WILLOW CREEKS bypass - STATION 05 - 18 AUG 2000							
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN
TOTAL ORGANISMS	1268	1403	1926	989	5586	1397	393
TAXA RICHNESS	45	42	39	43	64	42.3	2.5
SHAN. DIVERSITY	3.63	3.70	3.59	3.79	3.83	3.68	0.09
BIOTIC INDEX	4.59	5.10	4.45	4.91	4.73	4.76	0.30
EPT RICHNESS	22	17	19	20	29	19.5	2.1
% R.A. DOMINANT	29%	26%	33%	24%	29%	28%	3.9%
% R.A. FILTERERS	18%	4%	11%	10%	11%	11%	6%
METALS TOLERANCE	4.24	3.82	4.18	4.03	4.08	4.07	0.19
Baetidae/Ephemeroptera	0.73	0.35	0.83	0.54	0.62	0.61	0.22
Hydropsychinae/Trichoptera	0.29	0.07	0.19	0.22	0.20	0.19	0.09
EPT / (EPT + CHIR.)	0.72	0.64	0.73	0.70	0.70	0.70	0.04
Experimental Sediment Metrics							
% SEDIMENT TOLERANT	45%	43%	54%	50%	49%	48%	5%
SEDIMENT TOLERANT INDEX	6.92	7.52	6.93	7.24	7.13	7.15	0.28
FSBI	90	82	69	87	119	82.0	9.3

B.7 MACROINVERTEBRATE DATA								
WARM SPRINGS CREEK near mouth - STATION 06 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						15%	273	
<i>Optioservus spp.</i>	246	298	297	189	1030	14%	257.5	51.7
<i>Zaitzevia sp.</i>	1	0	1	5	7	0%	1.8	2.2
<i>Cleptelmis ornata</i>	2	16	5	21	44	1%	11.0	9.0
<i>Brychius sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Oreodytes spp.</i>	7	0	1	0	8	0%	2.0	3.4
DIPTERA						57%	1051	
<i>Thienemannimyia gp.</i>	8	12	4	0	24	0%	6.0	5.2
<i>Pentaneura sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Pagastia sp</i>	50	40	69	12	171	2%	42.8	23.8
<i>Potthastia spp.</i>	3	0	0	0	3	0%	0.8	1.5
<i>Brillia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Corynoneura sp</i>	1	0	1	1	3	0%	0.8	0.5
<i>Cricotopus spp.</i>	76	100	37	43	256	3%	64.0	29.5
<i>Cricotopus nostococladius</i>	0	1	0	0	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	5	16	26	19	66	1%	16.5	8.7
<i>Orthocladius spp.</i>	31	29	42	26	128	2%	32.0	7.0
<i>Paraphaenocladius sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	24	81	77	69	251	3%	62.8	26.3
<i>Microtendipes sp</i>	82	5	4	2	93	1%	23.3	39.2
<i>Polypedilum spp.</i>	3	0	0	0	3	0%	0.8	1.5
<i>Rheotanytarsus sp.</i>	106	70	31	67	274	4%	68.5	30.6
<i>Micropsectra spp.</i>	659	662	950	380	2651	36%	662.8	232.7
<i>Antocha sp.</i>	5	22	25	8	60	1%	15.0	10.0
<i>Dicranota sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Hexatoma sp.</i>	3	1	3	3	10	0%	2.5	1.0
<i>Tipula sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Simulium spp.</i>	2	99	47	48	196	3%	49.0	39.6
<i>Chelifera sp.</i>	1	2	2	1	6	0%	1.5	0.6
EPHEMEROPTERA						4%	69	
<i>Baetis tricaudatus</i>	34	59	65	38	196	3%	49.0	15.3
<i>Baetis punctiventris</i>	2	0	0	0	2	0%	0.5	1.0
<i>Diphetor hageni</i>	39	0	10	3	52	1%	13.0	17.8
<i>Drunella grandis</i>	0	0	0	1	1	0%	0.3	0.5
<i>Nixe sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia sp.</i>	2	0	1	0	3	0%	0.8	1.0
<i>Tricorythodes minutus</i>	21	1	0	0	22	0%	5.5	10.3
LEPIDOPTERA								
<i>Petrophila sp.</i>	1	0	0	0	1	0%	0.3	0.5

B.7

MACROINVERTEBRATE DATA

WARM SPRINGS CREEK near mouth - STATION 06 -18 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	0	1	1	0%	0.3	0.5
PLECOPTERA								
<i>Hesperoperla pacifica</i>	4	19	23	22	68	1%	17.0	8.8
<i>Amphinemura sp.</i>	5	17	29	8	59	1%	14.8	10.8
<i>Skwala sp.</i>	10	7	12	3	32	0%	8.0	3.9
<i>Pteronarcella badia</i>	20	82	108	51	261	4%	65.3	38.1
<i>Kathroperla perdita</i>	0	1	0	0	1	0%	0.3	0.5
TRICHOPTERA								
<i>Arctopsyche grandis</i>	4	12	22	16	54	1%	13.5	7.5
<i>Cheumatopsyche spp.</i>	3	12	13	2	30	0%	7.5	5.8
<i>Hydropsyche occidentalis</i>	113	308	297	264	982	13%	245.5	90.3
<i>Hydropsyche (C) cockerelli</i>	3	8	5	2	18	0%	4.5	2.6
<i>Neophylax sp.</i>	0	2	0	0	2	0%	0.5	1.0
<i>Hydroptila spp.</i>	10	17	10	2	39	1%	9.8	6.1
<i>Lepidostoma sp.</i>	4	5	0	0	9	0%	2.3	2.6
<i>Oecetis sp.</i>	3	0	1	0	4	0%	1.0	1.4
<i>Wormaldia sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Brachycentrus americanus</i>	4	74	34	66	178	2%	44.5	32.1
<i>Brachycentrus occidentalis</i>	4	2	1	2	9	0%	2.3	1.3
<i>Micrasema sp.</i>	0	2	10	5	17	0%	4.3	4.3
<i>Rhyacophila brunnea gp.</i>	0	8	4	6	18	0%	4.5	3.4
<i>Helicopsyche borealis</i>	2	0	0	0	2	0%	0.5	1.0
<i>Agapetus sp.</i>	2	5	12	1	20	0%	5.0	5.0
<i>Glossosoma sp.</i>	3	0	0	6	9	0%	2.3	2.9
ANNELIDA								
<i>Naididae</i>	4	0	0	0	4	0%	1.0	2.0
MOLLUSCA								
<i>Gyraulus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pisidium sp.</i>	1	0	1	0	2	0%	0.5	0.6

B.7 MACROINVERTEBRATE DATA								
WARM SPRINGS CREEK near mouth - STATION 06 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1617	2098	2283	1394	7392		1848	413
TAXA RICHNESS	48	38	40	36	60		40.5	5.3
SHAN. DIVERSITY	3.27	3.49	3.19	3.52	3.48		3.37	0.16
BIOTIC INDEX	4.59	4.42	4.21	4.39	4.39		4.40	0.15
EPT RICHNESS	22	20	18	19	28		19.8	1.7
% R.A. DOMINANT	41%	32%	42%	27%	36%		35%	7.0%
% R.A. FILTERERS	15%	28%	20%	34%	24%		24%	8%
METALS TOLERANCE	3.21	3.70	3.23	3.65	3.44		3.45	0.26
Baetidae/Ephemeroptera	0.76	0.98	0.99	0.98	0.90		0.93	0.11
Hydropsychinae/Trichoptera	0.77	0.72	0.77	0.72	0.74		0.74	0.03
EPT / (EPT + CHIR.)	0.22	0.39	0.35	0.45	0.35		0.35	0.10
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	17%	16%	14%	16%	15%		16%	1%
SEDIMENT TOLERANT INDEX	7.26	6.78	6.96	6.54	6.89		6.88	0.31
FSBI	103	95	93	103	128		98.5	5.3

B.8 MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Creek - STATION 07 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						29%	667	
<i>Optioservus spp.</i>	836	462	254	328	1880	21%	470.0	258.7
<i>Zaitzevia sp.</i>	152	99	58	87	396	4%	99.0	39.3
<i>Cleptelmis ornata</i>	144	49	101	97	391	4%	97.8	38.8
<i>Brychius sp.</i>	0	1	1	0	2	0%	0.5	0.6
DIPTERA						29%	667	
<i>Thienemannimyia gp.</i>	1	7	5	1	14	0%	3.5	3.0
<i>Pentaneura sp.</i>	0	0	4	0	4	0%	1.0	2.0
<i>Pagastia sp</i>	105	84	39	32	260	3%	65.0	35.2
<i>Corynoneura sp</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	64	29	90	70	253	3%	63.3	25.4
<i>Cricotopus nostococladius</i>	0	1	0	0	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	14	0	0	1	15	0%	3.8	6.8
<i>Orthocladius spp.</i>	60	8	19	80	167	2%	41.8	33.9
<i>Parametriocnemus sp.</i>	6	23	49	22	100	1%	25.0	17.8
<i>Tvetenia sp.</i>	82	20	103	76	281	3%	70.3	35.4
<i>Microtendipes sp</i>	37	131	263	68	499	5%	124.8	100.1
<i>Phaenopsectra sp</i>	0	2	0	0	2	0%	0.5	1.0
<i>Polypedilum spp.</i>	12	6	2	4	24	0%	6.0	4.3
<i>Rheotanytarsus sp.</i>	8	11	34	4	57	1%	14.3	13.5
<i>Tanytarsus sp.</i>	2	0	1	0	3	0%	0.8	1.0
<i>Micropsectra spp.</i>	185	28	182	139	534	6%	133.5	73.4
<i>Antocha sp.</i>	29	12	76	41	158	2%	39.5	27.1
<i>Hexatoma sp.</i>	0	1	1	2	4	0%	1.0	0.8
<i>Tipula sp.</i>	0	12	5	0	17	0%	4.3	5.7
<i>Atherix pachypus</i>	1	0	1	0	2	0%	0.5	0.6
<i>Simulium spp.</i>	53	12	167	39	271	3%	67.8	68.3
<i>Chelifera sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Hemerodromia sp.</i>	0	0	0	1	1	0%	0.3	0.5
EPHEMEROPTERA						4%	99	
<i>Acentrella insignicans</i>	0	0	1	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	81	27	54	38	200	2%	50.0	23.5
<i>Baetis punctiventralis</i>	13	1	33	1	48	1%	12.0	15.1
<i>Diphetor hageni</i>	0	3	4	0	7	0%	1.8	2.1
<i>Attenella margarita</i>	0	2	3	1	6	0%	1.5	1.3
<i>Paraleptophlebia sp.</i>	1	2	20	1	24	0%	6.0	9.3
<i>Tricorythodes minutus</i>	7	30	54	20	111	1%	27.8	19.9
LEPIDOPTERA								
<i>Petrophila sp.</i>	24	7	20	8	59	1%	14.8	8.5

B.8 MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Creek - STATION 07 -18 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
MEGALOPTERA								
<i>Sialis sp.</i>	0	0	2	0	2	0%	0.5	1.0
PLECOPTERA								
<i>Hesperoperla pacifica</i>	10	3	1	7	21	0%	5.3	4.0
<i>Amphinemura sp.</i>	5	5	10	12	32	0%	8.0	3.6
<i>Zapada oregonensis</i>	0	0	0	1	1	0%	0.3	0.5
<i>Isogenoides sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Skwala sp.</i>	0	3	0	1	4	0%	1.0	1.4
<i>Pteronarcella badia</i>	21	11	11	12	55	1%	13.8	4.9
TRICHOPTERA								
<i>Arctopsyche grandis</i>	0	1	1	0	2	0%	0.5	0.6
<i>Cheumatopsyche spp.</i>	10	16	5	3	34	0%	8.5	5.8
<i>Hydropsyche occidentalis</i>	617	245	848	642	2352	26%	588.0	251.0
<i>Hydropsyche (C) cockerelli</i>	6	2	23	13	44	0%	11.0	9.2
<i>Hydroptila spp.</i>	48	81	41	61	231	3%	57.8	17.6
<i>Ochrotrichia sp.</i>	5	4	15	16	40	0%	10.0	6.4
<i>Lepidostoma sp.</i>	1	1	0	2	4	0%	1.0	0.8
<i>Oecetis sp.</i>	3	13	6	5	27	0%	6.8	4.3
<i>Psychomyia flava</i>	5	0	1	0	6	0%	1.5	2.4
<i>Brachycentrus americanus</i>	0	0	2	0	2	0%	0.5	1.0
<i>Brachycentrus occidentalis</i>	4	5	6	2	17	0%	4.3	1.7
<i>Micrasema sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Rhyacophila brunnea gp.</i>	41	16	77	49	183	2%	45.8	25.1
<i>Helicopsyche borealis</i>	0	40	4	0	44	0%	11.0	19.4
<i>Protoptila sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Glossosoma sp.</i>	1	0	1	0	2	0%	0.5	0.6
ANNELIDA								
<i>Naididae</i>	1	0	0	5	6	0%	1.5	2.4
<i>Tubificidae</i>	10	3	20	8	41	0%	10.3	7.1
<i>Helobdella stagnalis</i>	0	0	1	0	1	0%	0.3	0.5
CRUSTACEA								
<i>Hyalella azteca</i>	0	1	3	3	7	0%	1.8	1.5
<i>Gammarus sp.</i>	0	1	3	0	4	0%	1.0	1.4
MOLLUSCA								
<i>Physella sp.</i>	0	20	17	0	37	0%	9.3	10.8
<i>Gyraulus sp.</i>	13	1	59	3	76	1%	19.0	27.2
<i>Fossaria sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pisidium sp.</i>	0	0	2	0	2	0%	0.5	1.0

B.8 MACROINVERTEBRATE DATA							
CLARK FORK RIVER below Warm Springs Creek - STATION 07 -18 AUG 2000							
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN
TOTAL ORGANISMS	2722	1542	2806	2006	9076	2269	603
TAXA RICHNESS	44	47	56	42	67	47.3	6.2
SHAN. DIVERSITY	3.48	3.78	3.97	3.65	3.89	3.72	0.21
BIOTIC INDEX	4.70	4.74	4.96	4.80	4.81	4.80	0.11
EPT RICHNESS	20	21	25	19	29	21.3	2.6
% R.A. DOMINANT	31%	30%	30%	32%	26%	31%	0.9%
% R.A. FILTERERS	26%	19%	39%	35%	31%	30%	9%
METALS TOLERANCE	4.73	4.79	4.41	4.55	4.60	4.62	0.17
Baetidae/Ephemeroptera	0.92	0.48	0.54	0.64	0.64	0.65	0.20
Hydropsychinae/Trichoptera	0.85	0.62	0.85	0.83	0.81	0.79	0.11
EPT / (EPT + CHIR.)	0.60	0.59	0.61	0.64	0.61	0.61	0.02
Experimental Sediment Metrics							
% SEDIMENT TOLERANT	42%	46%	17%	27%	32%	33%	13%
SEDIMENT TOLERANT INDEX	6.52	6.67	6.54	6.34	6.51	6.52	0.14
FSBI	85	101	120	97	140	100.8	14.5

B.9

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Dempsey - STATION 08 -17 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						27%	293	
<i>Optioservus</i> spp.	208	208	64	186	666	15%	166.5	69.1
<i>Zaitzevia</i> sp.	173	113	89	110	485	11%	121.3	36.1
<i>Cleptelmis ornata</i>	0	13	0	1	14	0%	3.5	6.4
Hydrophilidae	1	1	0	2	4	0%	1.0	0.8
<i>Brychius</i> sp.	0	0	1	0	1	0%	0.3	0.5
DIPTERA						8%	87	
<i>Thienemannimyia</i> gp.	0	2	0	0	2	0%	0.5	1.0
<i>Pagastia</i> sp.	0	2	0	1	3	0%	0.8	1.0
<i>Cardiocladius</i> spp.	1	1	2	0	4	0%	1.0	0.8
<i>Cricotopus</i> spp.	4	3	13	1	21	0%	5.3	5.3
<i>Orthocladius</i> spp.	20	2	3	2	27	1%	6.8	8.8
<i>Parametriocnemus</i> sp.	1	1	0	1	3	0%	0.8	0.5
<i>Tvetenia</i> sp.	83	22	25	10	140	3%	35.0	32.6
<i>Microtendipes</i> sp.	1	13	0	1	15	0%	3.8	6.2
<i>Phaenopsectra</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum</i> spp.	1	5	2	9	17	0%	4.3	3.6
<i>Tanytarsus</i> sp.	0	0	3	0	3	0%	0.8	1.5
<i>Micropsectra</i> spp.	0	0	0	1	1	0%	0.3	0.5
<i>Antocha</i> sp.	2	0	2	1	5	0%	1.3	1.0
<i>Hexatoma</i> sp.	6	0	4	8	18	0%	4.5	3.4
<i>Tipula</i> sp.	10	30	1	4	45	1%	11.3	13.0
<i>Simulium</i> spp.	3	10	23	3	39	1%	9.8	9.4
<i>Hemerodromia</i> sp.	2	1	0	0	3	0%	0.8	1.0
EPHEMEROPTERA						4%	49	
<i>Acentrella insignificans</i>	0	0	2	0	2	0%	0.5	1.0
<i>Baetis tricaudatus</i>	50	37	42	32	161	4%	40.3	7.7
<i>Baetis punctiventris</i>	4	1	2	0	7	0%	1.8	1.7
<i>Callibaetis</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Centroptilum</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Diphetor hageni</i>	0	1	0	2	3	0%	0.8	1.0
<i>Tricorythodes minutus</i>	0	3	6	11	20	0%	5.0	4.7
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	0	0	1	1	0%	0.3	0.5
ODONATA								
<i>Ischnura</i> sp.	0	0	1	0	1	0%	0.3	0.5

B.9 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Dempsey - STATION 08 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1949	1029	613	814	4405		1101	590
TAXA RICHNESS	35	39	37	39	56		37.5	1.9
SHAN. DIVERSITY	2.99	3.50	3.64	3.52	3.49		3.41	0.29
BIOTIC INDEX	4.70	4.68	4.62	4.51	4.65		4.63	0.09
EPT RICHNESS	18	22	21	19	28		20.0	1.8
% R.A. DOMINANT	44%	29%	31%	23%	34%		32%	9.0%
% R.A. FILTERERS	60%	38%	41%	27%	46%		42%	14%
METALS TOLERANCE	4.80	4.67	4.79	4.59	4.73		4.71	0.10
Baetidae/Ephemeroptera	1.00	0.93	0.89	0.76	0.90		0.89	0.10
Hydropsychinae/Trichoptera	0.90	0.77	0.89	0.59	0.83		0.79	0.15
EPT / (EPT + CHIR.)	0.93	0.92	0.89	0.95	0.92		0.92	0.03
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	35%	39%	29%	55%	39%		40%	11%
SEDIMENT TOLERANT INDEX	5.89	5.97	5.81	6.10	5.94		5.94	0.12
FSBI	88	87	86	76	110		84.3	5.6

B.10 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Sager Lane - STATION 08.5 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						7%	208	
<i>Optioservus spp.</i>	70	132	144	149	495	4%	123.8	36.5
<i>Zaitzevia sp.</i>	22	106	88	117	333	3%	83.3	42.5
<i>Cleptelmis ornata</i>	0	0	0	2	2	0%	0.5	1.0
DIPTERA						9%	253	
<i>Thienemannimyia gp.</i>	14	2	3	2	21	0%	5.3	5.9
<i>Nilotanypus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pentaneura sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pagastia sp.</i>	19	12	17	6	54	0%	13.5	5.8
<i>Potthastia spp.</i>	1	0	10	1	12	0%	3.0	4.7
<i>Cricotopus spp.</i>	10	16	36	11	73	1%	18.3	12.1
<i>Eukiefferiella spp.</i>	0	0	6	1	7	0%	1.8	2.9
<i>Orthocladius spp.</i>	15	1	4	12	32	0%	8.0	6.6
<i>Parametriocnemus sp.</i>	2	15	0	21	38	0%	9.5	10.1
<i>Tvetenia sp.</i>	57	66	90	139	352	3%	88.0	36.7
<i>Microtendipes sp</i>	26	32	20	5	83	1%	20.8	11.6
<i>Phaenopsectra sp</i>	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	6	31	30	14	81	1%	20.3	12.3
<i>Tanytarsus sp.</i>	0	0	4	0	4	0%	1.0	2.0
<i>Micropsectra spp.</i>	0	1	5	1	7	0%	1.8	2.2
<i>Antocha sp.</i>	19	25	48	21	113	1%	28.3	13.4
<i>Hexatoma sp.</i>	13	8	2	10	33	0%	8.3	4.6
<i>Tipula sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Atherix pachypus</i>	2	4	1	10	17	0%	4.3	4.0
<i>Simulium spp.</i>	3	10	5	59	77	1%	19.3	26.7
<i>Hemerodromia sp.</i>	1	0	0	2	3	0%	0.8	1.0
EPHEMEROPTERA						12%	353	
<i>Baetis tricaudatus</i>	115	279	78	628	1100	9%	275.0	251.0
<i>Baetis punctiventralis</i>	31	13	1	1	46	0%	11.5	14.2
<i>Diphetor hageni</i>	1	4	2	0	7	0%	1.8	1.7
<i>Attenella margarita</i>	21	9	17	1	48	0%	12.0	8.9
<i>Drunella grandis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Paraleptophlebia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	120	48	24	15	207	2%	51.8	47.6
HEMIPTERA								
<i>Sigara sp.</i>	0	0	0	1	1	0%	0.3	0.5

B.10 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Sager Lane - STATION 08.5 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1944	2643	2434	4802	11823	2956	1265	
TAXA RICHNESS	45	40	46	40	58	42.8	3.2	
SHAN. DIVERSITY	3.66	3.80	3.64	2.93	3.65	3.51	0.39	
BIOTIC INDEX	5.31	4.96	4.92	4.71	4.91	4.98	0.25	
EPT RICHNESS	21	21	24	18	27	21.0	2.4	
% R.A. DOMINANT	35%	26%	28%	48%	33%	34%	10%	
% R.A. FILTERERS	19%	42%	50%	66%	50%	45%	20%	
METALS TOLERANCE	4.22	4.66	4.78	4.90	4.71	4.64	0.30	
Baetidae/Ephemeroptera	0.51	0.84	0.65	0.98	0.82	0.74	0.20	
Hydropsychinae/Trichoptera	0.29	0.66	0.72	0.94	0.73	0.65	0.27	
EPT / (EPT + CHIR.)	0.91	0.92	0.89	0.95	0.93	0.92	0.02	
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	26%	28%	19%	11%	19%	21%	7%	
SEDIMENT TOLERANT INDEX	5.89	5.88	5.70	5.47	5.68	5.74	0.20	
FSBI	99	96	112	93	119	100.0	8.4	

B.11 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Deer Lodge - STATION 09 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	181	
<i>Optioservus</i> spp.	63	76	42	38	219	1%	54.8	17.9
<i>Zaitzevia</i> sp.	131	118	129	127	505	3%	126.3	5.7
DIPTERA						21%	804	
<i>Thienemannimyia</i> gp.	2	12	16	2	32	0%	8.0	7.1
<i>Nilotanypus</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Pentaneura</i> sp.	1	2	0	0	3	0%	0.8	1.0
<i>Pagastia</i> sp	13	48	2	11	74	0%	18.5	20.2
<i>Pothastia</i> spp.	0	0	2	0	2	0%	0.5	1.0
<i>Cardiocladius</i> spp.	1	1	0	0	2	0%	0.5	0.6
<i>Cricotopus</i> spp.	105	204	141	99	549	4%	137.3	48.2
<i>Eukiefferiella</i> spp.	1	1	11	0	13	0%	3.3	5.2
<i>Tvetenia</i> sp.	228	278	108	180	794	5%	198.5	72.4
<i>Microtendipes</i> sp	3	27	59	28	117	1%	29.3	23.0
<i>Phaenopsectra</i> sp	0	0	10	2	12	0%	3.0	4.8
<i>Polypedilum</i> spp.	120	201	127	160	608	4%	152.0	37.0
<i>Rheotanytarsus</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Tanytarsus</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Micropsectra</i> spp.	3	1	10	0	14	0%	3.5	4.5
<i>Antocha</i> sp.	40	53	31	64	188	1%	47.0	14.5
<i>Hexatoma</i> sp.	0	1	2	2	5	0%	1.3	1.0
<i>Tipula</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Atherix pachypus</i>	30	22	4	16	72	0%	18.0	11.0
<i>Simulium</i> spp.	208	113	366	1	688	4%	172.0	154.5
<i>Chelifera</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Hemerodromia</i> sp.	7	1	27	2	37	0%	9.3	12.1
EPHEMEROPTERA						19%	724	
<i>Acentrella insignificans</i>	0	1	0	1	2	0%	0.5	0.6
<i>Baetis tricaudatus</i>	936	473	370	114	1893	12%	473.3	343.4
<i>Baetis punctiventralis</i>	58	180	118	13	369	2%	92.3	72.6
<i>Attenella margarita</i>	0	25	0	1	26	0%	6.5	12.3
<i>Ephemerella inermis</i>	0	0	2	0	2	0%	0.5	1.0
<i>Paraleptophlebia</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	13	200	240	148	601	4%	150.3	98.9
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	1	0	1	2	0%	0.5	0.6

B.11

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Deer Lodge - STATION 09 -17 AUG 2000

B.11 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Deer Lodge - STATION 09 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	3855	4905	4122	2540	15422		3856	984
TAXA RICHNESS	36	43	43	39	56		40.3	3.4
SHAN. DIVERSITY	3.10	3.33	3.62	3.32	3.47		3.34	0.21
BIOTIC INDEX	4.78	4.91	5.00	4.86	4.89		4.89	0.09
EPT RICHNESS	18	19	20	18	26		18.8	1.0
% R.A. DOMINANT	35%	41%	34%	39%	37%		37%	3.2%
% R.A. FILTERERS	52%	56%	57%	53%	55%		55%	2%
METALS TOLERANCE	5.03	4.96	4.97	4.82	4.96		4.95	0.09
Baetidae/Ephemeroptera	0.99	0.74	0.67	0.46	0.78		0.72	0.22
Hydropsychinae/Trichoptera	0.97	0.92	0.88	0.89	0.92		0.92	0.04
EPT / (EPT + CHIR.)	0.86	0.83	0.86	0.79	0.84		0.83	0.03
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	8%	10%	16%	15%	12%		12%	4%
SEDIMENT TOLERANT INDEX	5.55	5.63	5.77	5.66	5.65		5.65	0.09
FSBI	84	93	98	97	120		93.0	6.4

B.12 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Little Blackfoot River - STATION 10 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						8%	158	
<i>Optioservus spp.</i>	34	60	53	31	178	2%	44.5	14.2
<i>Zaitzevia sp.</i>	110	147	125	72	454	6%	113.5	31.6
DIPTERA						32%	658	
<i>Thienemannimyia gp.</i>	6	3	10	4	23	0%	5.8	3.1
<i>Pentaneura sp.</i>	2	1	2	4	9	0%	2.3	1.3
<i>Pagastia sp</i>	1	1	2	2	6	0%	1.5	0.6
<i>Cricotopus spp.</i>	14	2	15	16	47	1%	11.8	6.6
<i>Eukiefferiella spp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Orthocladius spp.</i>	1	2	3	6	12	0%	3.0	2.2
<i>Parametriocnemus sp.</i>	11	0	2	2	15	0%	3.8	4.9
<i>Tvetenia sp.</i>	103	127	103	71	404	5%	101.0	23.0
<i>Cryptochironomus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Microtendipes sp</i>	85	13	13	43	154	2%	38.5	34.1
<i>Phaenopsectra sp</i>	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	132	86	148	63	429	5%	107.3	39.5
<i>Tanytarsus sp.</i>	0	0	1	3	4	0%	1.0	1.4
<i>Micropsectra spp.</i>	13	1	1	10	25	0%	6.3	6.2
<i>Antocha sp.</i>	1	34	17	3	55	1%	13.8	15.3
<i>Hexatoma sp.</i>	2	5	9	8	24	0%	6.0	3.2
<i>Tipula sp.</i>	1	0	12	0	13	0%	3.3	5.9
<i>Simulium spp.</i>	46	242	955	160	1403	17%	350.8	410.8
<i>Chelifera sp.</i>	2	1	0	0	3	0%	0.8	1.0
EPHEMEROPTERA						7%	146	
<i>Baetis tricaudatus</i>	44	20	19	43	126	2%	31.5	13.9
<i>Baetis punctiventralis</i>	12	2	10	33	57	1%	14.3	13.2
<i>Diphendor hageni</i>	1	0	2	0	3	0%	0.8	1.0
<i>Attenella margarita</i>	5	4	1	5	15	0%	3.8	1.9
<i>Drunella grandis</i>	1	0	1	0	2	0%	0.5	0.6
<i>Tricorythodes minutus</i>	129	47	94	109	379	5%	94.8	34.9
HEMIPTERA								
<i>Sigara sp.</i>	0	0	0	1	1	0%	0.3	0.5
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	3	0	3	0%	0.8	1.5

B.12

MACROINVERTEBRATE DATA

CLARK FORK RIVER above Little Blackfoot River - STATION 10 -17 AUG 2000

B.12 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Little Blackfoot River - STATION 10 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1564	2426	2744	1428	8162		2041	644
TAXA RICHNESS	42	34	44	37	52		39.3	4.6
SHAN. DIVERSITY	3.68	3.04	3.04	3.70	3.45		3.37	0.38
BIOTIC INDEX	4.90	4.92	5.25	5.07	5.05		5.03	0.16
EPT RICHNESS	21	18	20	17	24		19.0	1.8
% R.A. DOMINANT	29%	41%	35%	32%	33%		34%	5.2%
% R.A. FILTERERS	51%	75%	74%	56%	67%		64%	12%
METALS TOLERANCE	4.60	4.88	5.15	4.70	4.88		4.83	0.24
Baetidae/Ephemeroptera	0.30	0.30	0.24	0.40	0.32		0.31	0.07
Hydropsychinae/Trichoptera	0.94	0.97	0.95	0.88	0.94		0.93	0.04
EPT / (EPT + CHIR.)	0.73	0.88	0.81	0.80	0.81		0.80	0.06
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	28%	22%	14%	24%	21%		22%	6%
SEDIMENT TOLERANT INDEX	6.19	5.87	6.17	6.14	6.08		6.09	0.15
FSBI	107	87	111	74	117		94.8	17.4

B.13 MACROINVERTEBRATE DATA								
LITTLE BLACKFOOT RIVER near mouth - STATION 10.2 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						13%	191	
<i>Optioservus</i> spp.	56	190	69	149	464	8%	116.0	64.2
<i>Zaitzevia</i> sp.	59	111	49	82	301	5%	75.3	27.5
DIPTERA						47%	674	
<i>Thienemannimyia</i> gp.	1	0	0	3	4	0%	1.0	1.4
<i>Pentaneura</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Pagastia</i> sp	22	1	1	1	25	0%	6.3	10.5
<i>Potthastia</i> spp.	0	0	0	2	2	0%	0.5	1.0
<i>Cardiocladius</i> spp.	3	8	4	0	15	0%	3.8	3.3
<i>Cricotopus</i> spp.	30	13	28	2	73	1%	18.3	13.2
<i>Cricotopus nostococladius</i>	10	9	3	6	28	0%	7.0	3.2
<i>Eukiefferiella</i> spp.	45	4	16	0	65	1%	16.3	20.3
<i>Orthocladius</i> spp.	122	37	66	10	235	4%	58.8	48.0
<i>Synorthocladius</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	122	6	63	6	197	3%	49.3	55.4
<i>Microtendipes</i> sp	0	1	0	4	5	0%	1.3	1.9
<i>Polypedilum</i> spp.	4	11	19	2	36	1%	9.0	7.7
<i>Rheotanytarsus</i> sp.	16	1	16	6	39	1%	9.8	7.5
<i>Micropsectra</i> spp.	96	104	96	123	419	7%	104.8	12.7
<i>Antocha</i> sp.	127	78	133	174	512	9%	128.0	39.3
<i>Hexatoma</i> sp.	6	12	9	6	33	1%	8.3	2.9
<i>Limnophila</i> sp.	2	1	1	13	17	0%	4.3	5.9
<i>Ceratopogoninae</i>	0	0	0	2	2	0%	0.5	1.0
<i>Atherix pachypus</i>	26	1	2	2	31	1%	7.8	12.2
<i>Simulium (Eusimulium)</i>	300	52	493	111	956	17%	239.0	199.7
<i>Chelifera</i> sp.	0	1	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						9%	128	
<i>Acentrella insignificans</i>	1	1	0	2	4	0%	1.0	0.8
<i>Baetis tricaudatus</i>	101	199	56	84	440	8%	110.0	62.2
<i>Diphetor hageni</i>	3	11	0	1	15	0%	3.8	5.0
<i>Attenella margarita</i>	0	8	4	5	17	0%	4.3	3.3
<i>Serratella tibialis</i>	0	0	1	1	2	0%	0.5	0.6
<i>Drunella grandis</i>	7	2	5	2	16	0%	4.0	2.4
<i>Epeorus albertae</i>	0	1	0	1	2	0%	0.5	0.6
<i>Nixe</i> sp.	2	0	0	12	14	0%	3.5	5.7
<i>Paraleptophlebia</i> sp.	1	0	0	0	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila</i> sp.	1	2	1	13	17	0%	4.3	5.9

B.13

MACROINVERTEBRATE DATA

LITTLE BLACKFOOT RIVER near mouth - STATION 10.2 -17 AUG 2000

B.13 MACROINVERTEBRATE DATA								
LITTLE BLACKFOOT RIVER near mouth - STATION 10.2 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1762	1172	1489	1285	5708		1427	259
TAXA RICHNESS	44	48	42	49	60		45.8	3.3
SHAN. DIVERSITY	4.08	4.07	3.64	4.12	4.23		3.98	0.23
BIOTIC INDEX	4.67	4.13	4.61	4.01	4.40		4.36	0.33
EPT RICHNESS	22	26	22	25	30		23.8	2.1
% R.A. DOMINANT	19%	17%	33%	16%	17%		21%	7.9%
% R.A. FILTERERS	39%	16%	52%	28%	35%		34%	15%
METALS TOLERANCE	4.47	4.08	4.43	3.87	4.25		4.21	0.29
Baetidae/Ephemeroptera	0.91	0.95	0.85	0.81	0.90		0.88	0.06
Hydropsychinae/Trichoptera	0.81	0.57	0.81	0.64	0.72		0.71	0.12
EPT / (EPT + CHIR.)	0.57	0.72	0.56	0.76	0.64		0.65	0.10
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	8%	26%	8%	19%	14%		16%	9%
SEDIMENT TOLERANT INDEX	6.31	5.97	6.28	5.88	6.13		6.11	0.22
FSBI	119	137	121	134	151		127.8	9.1

B.14

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Gold Creek Bridge - STATION 11 -17 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA								
<i>Optioservus</i> spp.	90	64	49	38	241	4%	60.3	22.5
<i>Zaitzevia</i> sp.	164	148	141	76	529	9%	132.3	38.7
<i>Lara</i> sp.	0	0	1	0	1	0%	0.3	0.5
DIPTERA								
<i>Thienemannimyia</i> gp.	22	2	34	26	84	1%	21.0	13.6
<i>Pentaneura</i> sp.	10	3	0	2	15	0%	3.8	4.3
<i>Pagastia</i> sp.	1	0	2	0	3	0%	0.8	1.0
<i>Cardiocladius</i> spp.	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	6	5	7	3	21	0%	5.3	1.7
<i>Cricotopus nostococladius</i>	1	0	0	0	1	0%	0.3	0.5
<i>Eukiefferiella</i> spp.	1	0	1	0	2	0%	0.5	0.6
<i>Nanocladius</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Orthocladius</i> spp.	9	18	41	8	76	1%	19.0	15.3
<i>Parametriocnemus</i> sp.	4	3	23	25	55	1%	13.8	11.9
<i>Tvetenia</i> sp.	99	172	135	93	499	9%	124.8	36.6
<i>Microtendipes</i> sp.	87	28	71	25	211	4%	52.8	31.0
<i>Phaenopsectra</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum</i> spp.	37	32	6	26	101	2%	25.3	13.6
<i>Sublettia</i> sp.	2	0	0	0	2	0%	0.5	1.0
<i>Tanytarsus</i> sp.	6	0	1	0	7	0%	1.8	2.9
<i>Micropsectra</i> spp.	0	0	1	0	1	0%	0.3	0.5
<i>Antocha</i> sp.	60	61	190	25	336	6%	84.0	72.6
<i>Hexatoma</i> sp.	23	8	27	11	69	1%	17.3	9.2
<i>Atherix pachypus</i>	1	0	2	0	3	0%	0.8	1.0
<i>Simulium</i> spp.	22	44	186	186	438	8%	109.5	88.8
<i>Chelifera</i> sp.	1	0	2	0	3	0%	0.8	1.0
<i>Hemerodromia</i> sp.	0	1	0	3	4	0%	1.0	1.4
EPHEMEROPTERA								
<i>Baetis tricaudatus</i>	94	62	199	63	418	7%	104.5	64.7
<i>Baetis punctiventris</i>	27	5	68	17	117	2%	29.3	27.4
<i>Diphetor hageni</i>	0	1	2	0	3	0%	0.8	1.0
<i>Attenella margarita</i>	20	18	31	33	102	2%	25.5	7.6
<i>Ephemerella inermis</i>	0	0	2	1	3	0%	0.8	1.0
<i>Drunella grandis</i>	0	3	6	3	12	0%	3.0	2.4
<i>Nixe</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Rhithrogena</i> sp.	0	2	4	0	6	0%	1.5	1.9
<i>Tricorythodes minutus</i>	40	26	61	49	176	3%	44.0	14.8
LEPIDOPTERA								
<i>Petrophila</i> sp.	3	2	5	13	23	0%	5.8	5.0

B.14

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Gold Creek Bridge - STATION 11 -17 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	0	1	1	0%	0.3	0.5
PLECOPTERA								
<i>Claassenia sabulosa</i>	6	1	2	2	11	0%	2.8	2.2
<i>Hesperoperla pacifica</i>	1	5	1	0	7	0%	1.8	2.2
<i>Amphinemura sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Skwala sp.</i>	1	1	3	0	5	0%	1.3	1.3
<i>Isoperla fulva</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pteronarcella badia</i>	0	9	0	0	9	0%	2.3	4.5
<i>Pteronarcys californica</i>	0	0	1	0	1	0%	0.3	0.5
<i>Kathroperla perdita</i>	0	0	0	1	1	0%	0.3	0.5
<i>Chloroperlinae</i>	6	2	0	4	12	0%	3.0	2.6
TRICHOPTERA								
<i>Arctopsyche grandis</i>	3	10	6	1	20	0%	5.0	3.9
<i>Cheumatopsyche spp.</i>	24	52	38	29	143	3%	35.8	12.3
<i>Hydropsyche occidentalis</i>	113	162	255	158	688	12%	172.0	59.6
<i>Hydropsyche (C) cockerelli</i>	236	212	125	106	679	12%	169.8	63.9
<i>Hydropsyche (C) nr. morosa</i>	0	15	0	1	16	0%	4.0	7.3
<i>Hydropsyche oslari ?</i>	0	0	2	0	2	0%	0.5	1.0
<i>Hydroptila spp.</i>	18	45	11	3	77	1%	19.3	18.2
<i>Leucotrichia pictipes</i>	32	54	45	43	174	3%	43.5	9.0
<i>Lepidostoma sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Nectopsyche sp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Oecetis sp.</i>	45	36	63	54	198	3%	49.5	11.6
<i>Brachycentrus occidentalis</i>	0	0	2	3	5	0%	1.3	1.5
<i>Helicopsyche borealis</i>	17	0	9	0	26	0%	6.5	8.2
<i>Protoptila sp.</i>	0	3	4	0	7	0%	1.8	2.1
<i>Glossosoma sp.</i>	0	1	0	0	1	0%	0.3	0.5
ANNELIDA								
<i>Tubificidae</i>	0	1	0	0	1	0%	0.3	0.5
<i>Glossiphonia complinata</i>	1	0	0	0	1	0%	0.3	0.5
CRUSTACEA								
<i>Hyalella azteca</i>	1	0	0	0	1	0%	0.3	0.5
MOLLUSCA								
<i>Physella sp.</i>	23	2	6	4	35	1%	8.8	9.6
<i>Gyraulus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Fossaria sp.</i>	6	0	0	0	6	0%	1.5	3.0
<i>Pisidium sp.</i>	0	0	1	0	1	0%	0.3	0.5

B.14 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Gold Creek Bridge - STATION 11 -17 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
OTHER								
Turbellaria	0	1	1	1	3	0%	0.8	0.5
ID's by D. McGuire								
TOTAL ORGANISMS	1367	1323	1878	1137	5705		1426	317
TAXA RICHNESS	44	43	51	36	69		43.5	6.1
SHAN. DIVERSITY	4.23	4.06	4.21	4.11	4.32		4.15	0.08
BIOTIC INDEX	4.63	4.54	4.62	4.85	4.65		4.66	0.13
EPT RICHNESS	17	24	27	18	33		21.5	4.8
% R.A. DOMINANT	17%	16%	14%	16%	12%		16%	1.6%
% R.A. FILTERERS	29%	37%	33%	43%	35%		35%	6%
METALS TOLERANCE	4.16	4.24	4.33	4.35	4.27		4.27	0.09
Baetidae/Ephemeroptera	0.67	0.58	0.72	0.48	0.64		0.61	0.10
Hydropsychinae/Trichoptera	0.76	0.74	0.75	0.74	0.75		0.75	0.01
EPT / (EPT + CHIR.)	0.71	0.73	0.75	0.73	0.73		0.73	0.02
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	28%	25%	19%	22%	23%		23%	4%
SEDIMENT TOLERANT INDEX	6.03	5.87	5.89	6.11	5.96		5.98	0.11
FSBI	89	116	131	96	151		108.0	19.1

B.15 MACROINVERTEBRATE DATA								
FLINT CREEK at New Chicago - STATION 11.5 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						13%	165	
<i>Optioservus spp.</i>	247	120	199	17	583	11%	145.8	100.5
<i>Zaitzevia sp.</i>	24	18	34	1	77	2%	19.3	13.8
DIPTERA						21%	272	
<i>Thienemannimyia gp.</i>	0	3	0	0	3	0%	0.8	1.5
<i>Pagastia sp</i>	20	15	18	0	53	1%	13.3	9.1
<i>Cardiocladius spp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Cricotopus spp.</i>	12	42	120	4	178	3%	44.5	52.9
<i>Cricotopus nostococladius</i>	0	1	0	0	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Orthocladius spp.</i>	11	24	34	2	71	1%	17.8	14.1
<i>Parametriocnemus sp.</i>	2	20	0	0	22	0%	5.5	9.7
<i>Thienemanniella sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	46	23	15	0	84	2%	21.0	19.2
<i>Microtendipes sp</i>	32	55	51	7	145	3%	36.3	21.9
<i>Phaenopsectra sp</i>	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	107	143	162	17	429	8%	107.3	64.3
<i>Micropsectra spp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Antocha sp.</i>	17	37	22	4	80	2%	20.0	13.6
<i>Hexatoma sp.</i>	1	5	0	3	9	0%	2.3	2.2
<i>Atherix pachypus</i>	3	2	1	0	6	0%	1.5	1.3
EPHEMEROPTERA						5%	59	
<i>Acentrella insignicans</i>	0	0	0	1	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	85	30	71	2	188	4%	47.0	38.0
<i>Diphetor hageni</i>	0	6	0	0	6	0%	1.5	3.0
<i>Attenella margarita</i>	0	2	0	0	2	0%	0.5	1.0
<i>Drunella grandis</i>	0	3	7	0	10	0%	2.5	3.3
<i>Heptagenia sp.</i>	1	1	1	3	6	0%	1.5	1.0
<i>Tricorythodes minutus</i>	0	17	0	4	21	0%	5.3	8.1
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	0	1	0	1	0%	0.3	0.5
PLECOPTERA						3%	33	
<i>Claassenia sabulosa</i>	1	0	0	1	2	0%	0.5	0.6
<i>Hesperoperla pacifica</i>	1	2	4	0	7	0%	1.8	1.7
<i>Cultus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Skwala sp.</i>	1	3	1	3	8	0%	2.0	1.2
<i>Isoperla fulva</i>	0	2	0	0	2	0%	0.5	1.0
<i>Pteronarcella badia</i>	16	2	15	0	33	1%	8.3	8.4
<i>Pteronarcys californica</i>	11	33	11	21	76	1%	19.0	10.5
Chloroperlinae	0	1	1	0	2	0%	0.5	0.6

B.15 MACROINVERTEBRATE DATA

FLINT CREEK at New Chicago - STATION 11.5 -16 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA								
<i>Arctopsyche grandis</i>	3	10	15	0	28	1%	7.0	6.8
<i>Cheumatopsyche spp.</i>	1	5	2	2	10	0%	2.5	1.7
<i>Hydropsyche occidentalis</i>	216	195	213	4	628	12%	157.0	102.4
<i>Hydropsyche (C) cockerelli</i>	24	24	15	0	63	1%	15.8	11.3
<i>Hydropsyche (C) nr. morosa</i>	16	3	11	1	31	1%	7.8	7.0
<i>Hydroptila spp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Lepidostoma sp.</i>	4	1	17	3	25	0%	6.3	7.3
<i>Oecetis sp.</i>	2	11	1	1	15	0%	3.8	4.9
<i>Psychomyia flava</i>	1	3	2	0	6	0%	1.5	1.3
<i>Brachycentrus occidentalis</i>	142	944	347	464	1897	37%	474.3	340.3
<i>Rhyacophila sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Helicopsyche borealis</i>	0	0	3	0	3	0%	0.8	1.5
<i>Glossosoma sp.</i>	9	25	18	8	60	1%	15.0	8.0
ANNELIDA								
<i>Lumbricidae</i>	0	1	0	4	5	0%	1.3	1.9
<i>Tubificidae</i>	18	0	7	2	27	1%	6.8	8.1
MOLLUSCA								
<i>Physella sp.</i>	86	24	16	26	152	3%	38.0	32.3
<i>Ferrissia sp.</i>	0	0	0	0	0	0%	0.0	0.0
<i>Gyraulus sp.</i>	6	5	0	1	12	0%	3.0	2.9
<i>Fossaria sp.</i>	10	1	0	4	15	0%	3.8	4.5
ID's by D. McGuire								
TOTAL ORGANISMS	1178	1862	1439	614	5093		1273	522
TAXA RICHNESS	35	40	35	30	54		35.0	4.1
SHAN. DIVERSITY	3.68	2.96	3.59	1.80	3.43		3.01	0.87
BIOTIC INDEX	4.76	3.42	4.28	2.70	3.89		3.79	0.92
EPT RICHNESS	19	22	20	14	28		18.8	3.4
% R.A. DOMINANT	21%	51%	24%	76%	37%		43%	26%
% R.A. FILTERERS	34%	63%	42%	77%	52%		54%	20%
METALS TOLERANCE	4.47	3.73	4.58	3.12	4.07		3.98	0.69
<i>Baetidae/Ephemeroptera</i>	0.99	0.61	0.90	0.30	0.83		0.70	0.31
<i>Hydropsychinae/Trichoptera</i>	0.61	0.19	0.37	0.01	0.26		0.30	0.26
EPT / (EPT + CHIR.)	0.70	0.80	0.65	0.94	0.76		0.77	0.13
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	23%	9%	17%	4%	14%		13%	8%
SEDIMENT TOLERANT INDEX	6.17	5.14	5.85	4.64	5.52		5.45	0.69
FSBI	99	115	100	71	138		96.3	18.4

B.16 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Bearmouth- STATION 11.7 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	152	
<i>Optioservus spp.</i>	84	40	35	73	232	2%	58.0	24.2
<i>Zaitzevia sp.</i>	56	102	116	100	374	3%	93.5	26.0
DIPTERA						5%	150	
<i>Thienemannimyia gp.</i>	1	0	3	1	5	0%	1.3	1.3
<i>Pentaneura sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Pagastia sp</i>	0	0	2	0	2	0%	0.5	1.0
<i>Cardiocladius spp.</i>	0	0	1	2	3	0%	0.8	1.0
<i>Cricotopus spp.</i>	0	0	2	3	5	0%	1.3	1.5
<i>Eukiefferiella spp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Nanocladius sp.</i>	1	0	2	0	3	0%	0.8	1.0
<i>Orthocladius spp.</i>	6	44	3	29	82	1%	20.5	19.5
<i>Parametriocnemus sp.</i>	3	0	0	0	3	0%	0.8	1.5
<i>Tvetenia sp.</i>	16	25	17	34	92	1%	23.0	8.4
<i>Microtendipes sp</i>	20	5	21	15	61	1%	15.3	7.3
<i>Polypedilum spp.</i>	31	27	27	32	117	1%	29.3	2.6
<i>Rheotanytarsus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tanytarsus sp.</i>	1	0	0	2	3	0%	0.8	1.0
<i>Micropsectra spp.</i>	5	0	10	1	16	0%	4.0	4.5
<i>Antocha sp.</i>	32	10	36	36	114	1%	28.5	12.5
<i>Hexatoma sp.</i>	1	2	1	4	8	0%	2.0	1.4
<i>Atherix pachypus</i>	0	2	2	0	4	0%	1.0	1.2
<i>Simulium (Eusimulium)</i>	25	8	25	12	70	1%	17.5	8.8
<i>Hemerodromia sp.</i>	0	1	1	4	6	0%	1.5	1.7
EPHEMEROPTERA						6%	180	
<i>Acentrella insignicans</i>	0	2	16	4	22	0%	5.5	7.2
<i>Baetis tricaudatus</i>	203	68	34	59	364	3%	91.0	76.0
<i>Baetis punctiventris</i>	64	12	42	62	180	2%	45.0	24.1
<i>Diphendor hageni</i>	15	5	2	1	23	0%	5.8	6.4
<i>Attenella margarita</i>	17	0	1	5	23	0%	5.8	7.8
<i>Ephemerella inermis</i>	0	1	3	0	4	0%	1.0	1.4
<i>Drunella grandis</i>	2	16	13	7	38	0%	9.5	6.2
<i>Heptagenia sp.</i>	11	0	5	10	26	0%	6.5	5.1
<i>Rhithrogena sp.</i>	4	0	3	0	7	0%	1.8	2.1
<i>Tricorythodes minutus</i>	12	5	6	8	31	0%	7.8	3.1
LEPIDOPTERA								
<i>Petrophila sp.</i>	7	6	12	9	34	0%	8.5	2.6

B.16

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Bearmouth- STATION 11.7 -16 AUG 2000

B.16 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Bearmouth- STATION 11.7 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	2669	2693	2499	3221	11082	2771	313	
TAXA RICHNESS	43	33	47	42	57	41.3	5.9	
SHAN. DIVERSITY	2.93	2.33	2.90	2.81	2.81	2.74	0.28	
BIOTIC INDEX	4.83	4.84	5.03	4.98	4.92	4.92	0.10	
EPT RICHNESS	25	18	24	22	29	22.3	3.1	
% R.A. DOMINANT	48%	61%	50%	52%	53%	53%	5.8%	
% R.A. FILTERERS	72%	81%	72%	73%	75%	75%	5%	
METALS TOLERANCE	4.59	4.65	4.51	4.48	4.55	4.56	0.08	
Baetidae/Ephemeroptera	0.86	0.80	0.75	0.81	0.82	0.80	0.04	
Hydropsychinae/Trichoptera	0.93	0.92	0.85	0.83	0.88	0.88	0.05	
EPT / (EPT + CHIR.)	0.97	0.96	0.96	0.96	0.96	0.96	0.00	
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	15%	13%	23%	19%	17%	17%	4%	
SEDIMENT TOLERANT INDEX	5.47	5.32	5.62	5.53	5.49	5.49	0.13	
FSBI	114	108	128	112	141	115.5	8.7	

B.17 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Bonita- STATION 12 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	182	
<i>Optioservus spp.</i>	110	57	158	19	344	2%	86.0	60.8
<i>Zaitzevia sp.</i>	112	67	169	34	382	3%	95.5	58.5
DIPTERA						6%	214	
<i>Thienemannimyia gp.</i>	7	0	5	3	15	0%	3.8	3.0
<i>Pentaneura sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	2	0	0	1	3	0%	0.8	1.0
<i>Potthastia spp.</i>	1	1	0	1	3	0%	0.8	0.5
<i>Cricotopus spp.</i>	16	5	0	16	37	0%	9.3	8.1
<i>Eukiefferiella spp.</i>	0	1	1	1	3	0%	0.8	0.5
<i>Orthocladius spp.</i>	50	37	0	33	120	1%	30.0	21.3
<i>Tvetenia sp.</i>	48	14	21	1	84	1%	21.0	19.8
<i>Microtendipes sp</i>	53	6	36	1	96	1%	24.0	24.8
<i>Polypedilum spp.</i>	92	23	78	36	229	2%	57.3	33.0
<i>Rheotanytarsus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	9	6	3	5	23	0%	5.8	2.5
<i>Antocha sp.</i>	39	53	9	66	167	1%	41.8	24.5
<i>Hexatoma sp.</i>	1	0	7	0	8	0%	2.0	3.4
<i>Atherix pachypus</i>	11	10	24	4	49	0%	12.3	8.4
<i>Simulium spp.</i>	0	5	3	3	11	0%	2.8	2.1
<i>Hemerodromia sp.</i>	0	0	3	2	5	0%	1.3	1.5
EPHEMEROPTERA						3%	115	
<i>Acentrella insignificans</i>	1	0	0	7	8	0%	2.0	3.4
<i>Baetis tricaudatus</i>	23	68	66	43	200	1%	50.0	21.3
<i>Baetis punctiventralis</i>	7	6	23	7	43	0%	10.8	8.2
<i>Diphetor hageni</i>	2	3	12	0	17	0%	4.3	5.3
<i>Attenella margarita</i>	1	0	5	1	7	0%	1.8	2.2
<i>Ephemerella inermis</i>	3	1	0	1	5	0%	1.3	1.3
<i>Drunella grandis</i>	47	49	19	23	138	1%	34.5	15.7
<i>Heptagenia sp.</i>	0	1	2	0	3	0%	0.8	1.0
<i>Rhithrogena sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	1	0	30	7	38	0%	9.5	14.0
LEPIDOPTERA								
<i>Petrophila sp.</i>	12	12	11	57	92	1%	23.0	22.7
ODONATA								
<i>Ophiogomphus sp.</i>	5	0	0	0	5	0%	1.3	2.5

B.17 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Bonita- STATION 12 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	7	
<i>Claassenia sabulosa</i>	0	1	2	1	4	0%	1.0	0.8
<i>Hesperoperla pacifica</i>	1	2	1	0	4	0%	1.0	0.8
<i>Isogenoides sp.</i>	3	2	3	6	14	0%	3.5	1.7
<i>Skwala sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Isoperla fulva</i>	0	0	3	0	3	0%	0.8	1.5
TRICHOPTERA					84%	2933		
<i>Arctopsyche grandis</i>	5	4	1	2	12	0%	3.0	1.8
<i>Cheumatopsyche spp.</i>	300	381	253	174	1108	8%	277.0	86.7
<i>Hydropsyche occidentalis</i>	2750	2660	2050	972	8432	61%	2108.0	818.7
<i>Hydropsyche (C) cockerelli</i>	487	678	323	240	1728	12%	432.0	193.5
<i>Hydroptila spp.</i>	1	2	0	4	7	0%	1.8	1.7
<i>Ochrotrichia sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Nectopsyche sp.</i>	0	0	1	2	3	0%	0.8	1.0
<i>Oecetis sp.</i>	120	80	155	61	416	3%	104.0	42.0
<i>Psychomyia flava</i>	0	0	0	1	1	0%	0.3	0.5
<i>Helicopsyche borealis</i>	0	0	5	5	10	0%	2.5	2.9
<i>Protoptila sp.</i>	0	11	0	1	12	0%	3.0	5.4
<i>Glossosoma sp.</i>	0	1	0	1	2	0%	0.5	0.6
MOLLUSCA					0%	7		
<i>Physella sp.</i>	0	0	3	2	5	0%	1.3	1.5
<i>Gyraulus sp.</i>	0	0	15	0	15	0%	3.8	7.5
<i>Fossaria sp.</i>	0	0	6	0	6	0%	1.5	3.0
OTHER								
Turbellaria	2	0	0	1	3	0%	0.8	1.0
ID's by D. McGuire								
TOTAL ORGANISMS	4322	4250	3509	1846	13927		3482	1151
TAXA RICHNESS	33	34	37	40	52		36.0	3.2
SHAN. DIVERSITY	2.16	2.01	2.46	2.69	2.33		2.33	0.30
BIOTIC INDEX	4.92	4.80	4.96	4.84	4.89		4.88	0.07
EPT RICHNESS	16	18	20	21	27		18.8	2.2
% R.A. DOMINANT	64%	63%	58%	53%	61%		59%	5.0%
% R.A. FILTERERS	82%	88%	75%	75%	81%		80%	6%
METALS TOLERANCE	4.72	4.71	4.68	4.61	4.69		4.68	0.05
Baetidae/Ephemeroptera	0.39	0.60	0.64	0.64	0.58		0.57	0.12
Hydropsychinae/Trichoptera	0.97	0.97	0.94	0.95	0.96		0.96	0.02
EPT / (EPT + CHIR.)	0.93	0.98	0.95	0.94	0.95		0.95	0.02
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	15%	14%	22%	16%	17%		17%	4%
SEDIMENT TOLERANT INDEX	5.49	5.38	5.58	5.52	5.49		5.50	0.08
FSBI	96	87	104	96	125		95.8	6.9

B.18 MACROINVERTEBRATE DATA								
ROCK CREEK near Clinton - STATION 12.5 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	7	
<i>Optioservus spp.</i>	1	2	4	1	8	0%	2.0	1.4
<i>Zaitzevia sp.</i>	7	5	5	3	20	1%	5.0	1.6
<i>Ordobrevia sp.</i>	0	0	0	1	1	0%	0.3	0.5
DIPTERA						58%	253	
<i>Thienemannimyia gp.</i>	3	0	4	0	7	0%	1.8	2.1
<i>Pagastia sp</i>	16	4	16	7	43	2%	10.8	6.2
<i>Pothastia spp.</i>	6	0	0	0	6	0%	1.5	3.0
<i>Cardiocladius spp.</i>	0	0	0	3	3	0%	0.8	1.5
<i>Corynoneura sp</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	6	3	14	26	49	3%	12.3	10.3
<i>Cricotopus nostococladius</i>	0	4	4	6	14	1%	3.5	2.5
<i>Eukiefferiella spp.</i>	5	3	8	7	23	1%	5.8	2.2
<i>Orthocladius spp.</i>	2	4	3	10	19	1%	4.8	3.6
<i>Parametriocnemus sp.</i>	2	4	1	0	7	0%	1.8	1.7
<i>Tvetenia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Microtendipes sp</i>	5	0	8	0	13	1%	3.3	3.9
<i>Phaenopsectra sp</i>	0	0	2	0	2	0%	0.5	1.0
<i>Polypedilum spp.</i>	5	2	11	0	18	1%	4.5	4.8
<i>Tanytarsus sp.</i>	7	0	8	2	17	1%	4.3	3.9
<i>Micropsectra/Krenopsectra</i>	131	264	97	151	643	37%	160.8	72.4
<i>Antocha sp.</i>	23	3	41	37	104	6%	26.0	17.2
<i>Hexatoma sp.</i>	2	0	1	3	6	0%	1.5	1.3
<i>Limnophila sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ceratopogoninae</i>	0	0	0	3	3	0%	0.8	1.5
<i>Atherix pachypus</i>	3	3	3	0	9	1%	2.3	1.5
<i>Simulium (Eusimulium)</i>	2	16	2	1	21	1%	5.3	7.2
EPHEMEROPTERA						17%	73	
<i>Acentrella insignicans</i>	10	15	10	11	46	3%	11.5	2.4
<i>Baetis tricaudatus</i>	16	4	17	3	40	2%	10.0	7.5
<i>Diphotor hageni</i>	0	0	0	2	2	0%	0.5	1.0
<i>Attenella margarita</i>	4	1	5	1	11	1%	2.8	2.1
<i>Serratella tibialis</i>	5	18	4	2	29	2%	7.3	7.3
<i>Ephemerella inermis</i>	1	0	1	0	2	0%	0.5	0.6
<i>Drunella grandis</i>	14	7	5	6	32	2%	8.0	4.1
<i>Epeorus albertae</i>	8	15	16	2	41	2%	10.3	6.6
<i>Nixe sp.</i>	18	9	27	5	59	3%	14.8	9.8
<i>Rhithrogena sp.</i>	3	0	1	0	4	0%	1.0	1.4
<i>Paraleptophlebia bicornuta</i>	10	0	3	8	21	1%	5.3	4.6
<i>Tricorythodes minutus</i>	4	0	1	0	5	0%	1.3	1.9
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	0	1	0	1	0%	0.3	0.5

B.18 MACROINVERTEBRATE DATA								
ROCK CREEK near Clinton - STATION 12.5 -16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						2%	10	
<i>Claassenia sabulosa</i>	0	1	1	1	3	0%	0.8	0.5
<i>Hesperoperla pacifica</i>	3	4	3	1	11	1%	2.8	1.3
<i>Calineruria californica</i>	0	1	1	0	2	0%	0.5	0.6
<i>Isogenoides sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Skwala sp.</i>	3	3	2	2	10	1%	2.5	0.6
<i>Pteronarcella badia</i>	3	0	0	0	3	0%	0.8	1.5
<i>Pteronarcys californica</i>	0	0	1	3	4	0%	1.0	1.4
Chloroperlinae	1	2	1	1	5	0%	1.3	0.5
TRICHOPTERA						20%	86	
<i>Arctopsyche grandis</i>	15	12	11	6	44	3%	11.0	3.7
<i>Cheumatopsyche spp.</i>	4	0	2	4	10	1%	2.5	1.9
<i>Hydropsyche occidentalis</i>	52	5	31	13	101	6%	25.3	20.9
<i>Hydropsyche (C) cockerelli</i>	21	25	10	11	67	4%	16.8	7.4
<i>Dicosmoecus sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Neophylax sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Lepidostoma sp.</i>	3	0	3	1	7	0%	1.8	1.5
<i>Wormaldia sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Psychomyia flava</i>	0	0	0	2	2	0%	0.5	1.0
<i>Brachycentrus occidentalis</i>	25	14	33	22	94	5%	23.5	7.9
<i>Rhyacophila coloradensis gp.</i>	0	1	0	3	4	0%	1.0	1.4
<i>Glossosoma sp.</i>	3	9	0	0	12	1%	3.0	4.2
ANNELIDA						1%	2	
Enchytridae	4	0	1	0	5	0%	1.3	1.9
Tubificidae	3	0	0	1	4	0%	1.0	1.4
MOLLUSCA						0%	0	
<i>Pisidium sp.</i>	0	0	1	0	1	0%	0.3	0.5
ID's by D. McGuire								
TOTAL ORGANISMS	463	464	427	373	1727		432	43
TAXA RICHNESS	45	32	47	39	61		40.8	6.8
SHAN. DIVERSITY	4.24	2.89	4.35	3.61	4.04		3.77	0.67
BIOTIC INDEX	3.67	3.68	3.81	3.98	3.77		3.79	0.14
EPT RICHNESS	25	19	24	23	32		22.8	2.6
% R.A. DOMINANT	28%	57%	23%	40%	37%		37%	15%
% R.A. FILTERERS	26%	16%	21%	15%	20%		19%	5%
METALS TOLERANCE	3.00	1.98	3.20	3.12	2.80		2.83	0.57
Baetidae/Ephemeroptera	0.28	0.28	0.30	0.40	0.30		0.31	0.06
Hydropsychinae/Trichoptera	0.62	0.45	0.48	0.44	0.52		0.50	0.08
EPT / (EPT + CHIR.)	0.55	0.34	0.52	0.34	0.44		0.44	0.11
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	4%	2%	3%	2%	3%		3%	1%
SEDIMENT TOLERANT INDEX	6.14	6.73	6.10	6.54	6.37		6.38	0.31
FSBI	143	116	144	127	168		132.5	13.5

B.19 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Turah - STATION 13 - 16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						7%	101	
<i>Optioservus spp.</i>	14	43	29	69	155	3%	38.8	23.4
<i>Zaitzevia sp.</i>	57	31	88	73	249	4%	62.3	24.4
DIPTERA						22%	324	
<i>Thienemannimyia gp.</i>	2	2	0	2	6	0%	1.5	1.0
<i>Pagastia sp</i>	1	2	7	14	24	0%	6.0	5.9
<i>Potthastia spp.</i>	0	0	3	7	10	0%	2.5	3.3
<i>Cardiocladius spp.</i>	0	0	5	0	5	0%	1.3	2.5
<i>Corynoneura sp</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	45	38	84	64	231	4%	57.8	20.7
<i>Cricotopus nostococladius</i>	0	0	0	1	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	1	1	15	6	23	0%	5.8	6.6
<i>Orthocladius spp.</i>	69	10	50	11	140	2%	35.0	29.3
<i>Parametriocnemus sp.</i>	4	0	0	0	4	0%	1.0	2.0
<i>Rheocricotopus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	51	21	47	20	139	2%	34.8	16.5
<i>Microtendipes sp</i>	0	0	1	1	2	0%	0.5	0.6
<i>Polypedilum spp.</i>	24	12	26	30	92	2%	23.0	7.7
<i>Rheotanytarsus sp.</i>	18	25	28	42	113	2%	28.3	10.1
<i>Tanytarsus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Micropsectra/Krenopsectra</i>	50	46	105	27	228	4%	57.0	33.5
<i>Antocha sp.</i>	11	81	55	63	210	4%	52.5	29.7
<i>Hexatoma sp.</i>	8	4	9	1	22	0%	5.5	3.7
<i>Atherix pachypus</i>	0	0	1	1	2	0%	0.5	0.6
<i>Simulium spp.</i>	23	0	7	0	30	1%	7.5	10.8
<i>Chelifera sp.</i>	1	2	0	4	7	0%	1.8	1.7
<i>Hemerodromia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Protanyderus sp.</i>	0	0	0	1	1	0%	0.3	0.5
EPHEMEROPTERA						10%	148	
<i>Acentrella insignificans</i>	7	2	12	1	22	0%	5.5	5.1
<i>Baetis tricaudatus</i>	83	6	37	8	134	2%	33.5	35.9
<i>Diphetor hageni</i>	13	0	16	2	31	1%	7.8	7.9
<i>Attenella margarita</i>	0	0	0	4	4	0%	1.0	2.0
<i>Serratella tibialis</i>	56	20	24	25	125	2%	31.3	16.6
<i>Ephemerella inermis</i>	0	1	1	2	4	0%	1.0	0.8
<i>Drunella grandis</i>	27	32	38	37	134	2%	33.5	5.1
<i>Epeorus albertae</i>	0	0	1	1	2	0%	0.5	0.6
<i>Rhithrogena sp.</i>	44	3	59	20	126	2%	31.5	24.9
<i>Paraleptophlebia bicornuta</i>	2	0	1	0	3	0%	0.8	1.0
<i>Tricorythodes minutus</i>	0	0	0	7	7	0%	1.8	3.5

B.19 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Turah - STATION 13 - 16 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	37	15	22	74	1%	18.5	15.4
PLECOPTERA								
<i>Claassenia sabulosa</i>	3	3	8	8	22	0%	5.5	2.9
<i>Hesperoperla pacifica</i>	11	4	13	22	50	1%	12.5	7.4
<i>Isogenoides sp.</i>	6	2	2	1	11	0%	2.8	2.2
<i>Skwala sp.</i>	1	7	1	0	9	0%	2.3	3.2
<i>Isoperla fulva</i>	0	0	1	1	2	0%	0.5	0.6
<i>Pteronarcella badia</i>	16	5	12	17	50	1%	12.5	5.4
<i>Pteronarcys californica</i>	0	1	4	4	9	0%	2.3	2.1
Chloroperlinae	10	0	3	0	13	0%	3.3	4.7
TRICHOPTERA								
<i>Arctopsyche grandis</i>	50	44	23	45	162	3%	40.5	12.0
<i>Cheumatopsyche spp.</i>	43	24	30	69	166	3%	41.5	20.0
<i>Hydropsyche occidentalis</i>	1010	221	448	439	2118	36%	529.5	337.1
<i>Hydropsyche (C) cockerelli</i>	188	133	99	131	551	9%	137.8	36.9
<i>Lepidostoma sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Oecetis sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Psychomyia flava</i>	0	7	3	10	20	0%	5.0	4.4
<i>Brachycentrus occidentalis</i>	18	137	33	44	232	4%	58.0	53.7
<i>Glossosoma sp.</i>	8	6	13	6	33	1%	8.3	3.3
MOLLUSCA								
<i>Physella sp.</i>	0	1	0	0	1	0%	0.3	0.5
ID's by D. McGuire								
TOTAL ORGANISMS	1979	1015	1459	1364	5817		1454	399
TAXA RICHNESS	39	36	44	44	56		40.8	3.9
SHAN. DIVERSITY	3.09	3.90	4.05	3.93	3.85		3.74	0.44
BIOTIC INDEX	4.47	3.93	4.29	4.27	4.28		4.24	0.23
EPT RICHNESS	21	19	25	24	28		22.3	2.8
% R.A. DOMINANT	51%	22%	31%	32%	36%		34%	12%
% R.A. FILTERERS	68%	58%	46%	56%	58%		57%	9%
METALS TOLERANCE	4.41	3.88	4.28	4.34	4.27		4.23	0.24
Baetidae/Ephemeroptera	0.44	0.13	0.34	0.10	0.32		0.25	0.17
Hydropsychinae/Trichoptera	0.94	0.66	0.89	0.86	0.86		0.84	0.12
EPT / (EPT + CHIR.)	0.86	0.81	0.70	0.80	0.80		0.79	0.06
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	6%	10%	10%	16%	10%		10%	4%
SEDIMENT TOLERANT INDEX	5.36	5.20	5.65	5.45	5.43		5.42	0.19
FSBI	110	107	132	126	150		118.8	12.1

B.20 MACROINVERTEBRATE DATA								
BLACKFOOT RIVER at USGS near mouth - STATION 14 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						11%	78	
<i>Optioservus</i> spp.	32	151	23	6	212	7%	53.0	66.2
<i>Zaitzevia</i> sp.	22	26	36	9	93	3%	23.3	11.2
<i>Cleptelmis ornata</i>	3	0	1	0	4	0%	1.0	1.4
<i>Ordobrevia</i> sp.	1	0	0	0	1	0%	0.3	0.5
DIPTERA						59%	425	
<i>Thienemannimyia</i> gp.	2	0	0	0	2	0%	0.5	1.0
<i>Pagastia</i> sp	1	0	0	0	1	0%	0.3	0.5
<i>Potthastia</i> spp.	1	0	1	0	2	0%	0.5	0.6
<i>Cardiocladius</i> spp.	1	0	0	0	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	4	5	5	4	18	1%	4.5	0.6
<i>Eukiefferiella</i> spp.	4	3	5	2	14	0%	3.5	1.3
<i>Orthocladius</i> spp.	18	8	58	5	89	3%	22.3	24.5
<i>Synorthocladius</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	0	3	8	2	13	0%	3.3	3.4
<i>Microtendipes</i> sp	0	2	1	6	9	0%	2.3	2.6
<i>Polypedilum</i> spp.	8	6	13	0	27	1%	6.8	5.4
<i>Sublettia</i> sp. sp.	0	3	0	1	4	0%	1.0	1.4
<i>Rheotanytarsus</i> sp.	2	3	1	2	8	0%	2.0	0.8
<i>Tanytarsus</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Micropsectra/Krenopectra</i>	697	272	157	344	1470	51%	367.5	232.8
<i>Antocha</i> sp.	2	0	2	2	6	0%	1.5	1.0
<i>Hexatoma</i> sp.	6	4	18	7	35	1%	8.8	6.3
EPHEMEROPTERA						5%	35	
<i>Acentrella insignicans</i>	1	1	2	0	4	0%	1.0	0.8
<i>Baetis tricaudatus</i>	3	5	8	2	18	1%	4.5	2.6
<i>Diphetor hageni</i>	5	0	0	1	6	0%	1.5	2.4
<i>Attenella margarita</i>	0	0	1	1	2	0%	0.5	0.6
<i>Serratella tibialis</i>	4	8	27	3	42	1%	10.5	11.2
<i>Ephemerella inermis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	6	4	14	6	30	1%	7.5	4.4
<i>Timpango hecuba</i>	0	1	1	0	2	0%	0.5	0.6
<i>Epeorus albertae</i>	1	3	5	4	13	0%	3.3	1.7
<i>Nixe</i> sp.	2	0	0	0	2	0%	0.5	1.0
<i>Rhithrogena</i> sp.	2	4	9	3	18	1%	4.5	3.1
<i>Tricorythodes minutus</i>	0	2	0	0	2	0%	0.5	1.0
LEPIDOPTERA								
<i>Petrophila</i> sp.	1	2	0	6	9	0%	2.3	2.6
PLECOPTERA						1%	8	
<i>Claassenia sabulosa</i>	5	1	1	4	11	0%	2.8	2.1
<i>Calineruria californica</i>	2	1	4	5	12	0%	3.0	1.8
<i>Cultus</i> sp.	1	0	1	0	2	0%	0.5	0.6
<i>Skwala</i> sp.	1	0	0	1	2	0%	0.5	0.6

B.20 MACROINVERTEBRATE DATA								
BLACKFOOT RIVER at USGS near mouth - STATION 14 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S.D.
<i>Pteronarcys californica</i>	2	0	1	0	3	0%	0.8	1.0
Chloroperlinae	0	0	0	2	2	0%	0.5	1.0
TRICHOPTERA						21%	150	
<i>Arctopsyche grandis</i>	2	0	4	1	7	0%	1.8	1.7
<i>Cheumatopsyche spp.</i>	4	11	5	6	26	1%	6.5	3.1
<i>Hydropsyche occidentalis</i>	13	40	132	15	200	7%	50.0	56.0
<i>Hydropsyche (C) cockerelli</i>	16	17	62	25	120	4%	30.0	21.7
<i>Hydropsyche oslari ?</i>	1	1	0	0	2	0%	0.5	0.6
<i>Dicosmoecus sp.</i>	7	0	0	12	19	1%	4.8	5.9
<i>Onocomoecus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Neophylax sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Lepidostoma sp.</i>	3	12	2	5	22	1%	5.5	4.5
<i>Ceraclea sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Oecetis sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Psychomyia flava</i>	0	0	1	4	5	0%	1.3	1.9
<i>Brachycentrus occidentalis</i>	11	18	37	11	77	3%	19.3	12.3
<i>Rhyacophila angelita gp.</i>	1	0	10	5	16	1%	4.0	4.5
<i>Helicopsyche borealis</i>	2	0	0	0	2	0%	0.5	1.0
<i>Protoptila sp.</i>	4	5	2	2	13	0%	3.3	1.5
<i>Glossosoma sp.</i>	20	24	19	20	83	3%	20.8	2.2
ANNELIDA						0%	0	
Lumbricidae	0	0	0	1	1	0%	0.3	0.5
MOLLUSCA						3%	21	
<i>Physella sp.</i>	52	4	4	22	82	3%	20.5	22.6
OTHER								
Turbellaria	4	4	2	2	12	0%	3.0	1.2
ID's by D. McGuire								
TOTAL ORGANISMS	983	655	685	562	2885		721	182
TAXA RICHNESS	47	34	40	41	60		40.5	5.3
SHAN. DIVERSITY	2.18	3.05	3.81	2.78	3.19		2.96	0.68
BIOTIC INDEX	4.15	4.06	3.96	3.87	4.03		4.01	0.12
EPT RICHNESS	28	19	23	24	35		23.5	3.7
% R.A. DOMINANT	71%	42%	23%	61%	51%		49%	21%
% R.A. FILTERERS	5%	14%	35%	11%	15%		16%	13%
METALS TOLERANCE	1.82	2.88	3.23	1.87	2.41		2.45	0.71
Baetidae/Ephemeroptera	0.38	0.21	0.15	0.15	0.20		0.22	0.11
Hydropsychinae/Trichoptera	0.47	0.53	0.73	0.54	0.61		0.57	0.11
EPT / (EPT + CHIR.)	0.14	0.34	0.58	0.28	0.32		0.34	0.18
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	7%	29%	9%	4%	12%		12%	11%
SEDIMENT TOLERANT INDEX	7.45	6.89	6.07	7.09	6.93		6.88	0.58
FSBI	134	86	117	111	153		112.0	19.9

B.21 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Missoula - STATION 15.5 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S.D.
COLEOPTERA						8%	129	
<i>Optioservus spp.</i>	10	22	28	41	101	2%	25.3	12.9
<i>Zaitzevia sp.</i>	53	139	91	117	400	6%	100.0	37.0
<i>Cleptelmis ornata</i>	0	0	3	12	15	0%	3.8	5.7
DIPTERA						43%	707	
<i>Thienemannimyia gp.</i>	0	2	8	0	10	0%	2.5	3.8
<i>Pagastia sp</i>	0	2	0	2	4	0%	1.0	1.2
<i>Potthastia spp.</i>	13	15	1	3	32	0%	8.0	7.0
<i>Cardiocladius spp.</i>	0	4	1	2	7	0%	1.8	1.7
<i>Corynoneura sp</i>	0	0	0	2	2	0%	0.5	1.0
<i>Cricotopus spp.</i>	72	58	101	114	345	5%	86.3	25.7
<i>Cricotopus nostococladius</i>	2	12	1	13	28	0%	7.0	6.4
<i>Eukiefferiella spp.</i>	2	1	0	2	5	0%	1.3	1.0
<i>Nanocladius sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Orthocladius spp.</i>	210	97	199	471	977	15%	244.3	159.5
<i>Parametriocnemus sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Synorthocladius sp.</i>	1	1	0	1	3	0%	0.8	0.5
<i>Tvetenia sp.</i>	71	51	102	114	338	5%	84.5	28.8
<i>Microtendipes sp</i>	0	7	3	16	26	0%	6.5	7.0
<i>Phaenopsectra sp</i>	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	150	49	135	113	447	7%	111.8	44.5
<i>Rheotanytarsus sp.</i>	15	18	26	14	73	1%	18.3	5.4
<i>Micropsectra/Krenopsectra</i>	59	82	23	78	242	4%	60.5	26.9
<i>Antocha sp.</i>	90	55	26	34	205	3%	51.3	28.6
<i>Atherix pachypus</i>	1	0	0	0	1	0%	0.3	0.5
<i>Simulium spp.</i>	1	0	3	29	33	1%	8.3	13.9
<i>Chelifera sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Hemerodromia sp.</i>	26	11	1	6	44	1%	11.0	10.8
EPHEMEROPTERA						5%	90	
<i>Baetis tricaudatus</i>	17	34	31	50	132	2%	33.0	13.5
<i>Baetis punctiventris</i>	0	1	0	0	1	0%	0.3	0.5
<i>Diphotor hageni</i>	5	36	17	12	70	1%	17.5	13.3
<i>Attenella margarita</i>	0	0	3	1	4	0%	1.0	1.4
<i>Serratella tibialis</i>	8	6	24	39	77	1%	19.3	15.4
<i>Ephemerella inermis</i>	0	0	2	0	2	0%	0.5	1.0
<i>Drunella grandis</i>	12	4	6	4	26	0%	6.5	3.8
<i>Epeorus albertae</i>	13	4	8	3	28	0%	7.0	4.5
<i>Heptagenia sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Rhithrogena sp.</i>	1	2	2	1	6	0%	1.5	0.6
<i>Tricorythodes minutus</i>	1	3	4	2	10	0%	2.5	1.3
LEPIDOPTERA								
<i>Petrophila sp.</i>	13	28	17	1	59	1%	14.8	11.1

B.21 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Missoula - STATION 15.5 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						1%	21	
<i>Claassenia sabulosa</i>	0	2	0	8	10	0%	2.5	3.8
<i>Hesperoperla pacifica</i>	5	0	4	3	12	0%	3.0	2.2
<i>Calineruria californica</i>	0	2	1	0	3	0%	0.8	1.0
<i>Skwala sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Isoperla fulva</i>	0	0	1	2	3	0%	0.8	1.0
<i>Pteronarcella badia</i>	0	0	1	3	4	0%	1.0	1.4
<i>Pteronarcys californica</i>	6	19	9	15	49	1%	12.3	5.9
Chloroperlinae	0	0	0	1	1	0%	0.3	0.5
TRICHOPTERA					38%	622		
<i>Arctopsyche grandis</i>	18	7	10	9	44	1%	11.0	4.8
<i>Cheumatopsyche spp.</i>	45	70	33	69	217	3%	54.3	18.3
<i>Hydropsyche occidentalis</i>	369	486	360	473	1688	26%	422.0	66.7
<i>Hydropsyche (C) cockerelli</i>	106	46	56	71	279	4%	69.8	26.3
<i>Hydropsyche oslari ?</i>	0	0	1	0	1	0%	0.3	0.5
<i>Hydroptila spp.</i>	30	23	28	13	94	1%	23.5	7.6
<i>Lepidostoma sp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Oecetis sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Psychomyia flava</i>	17	19	6	4	46	1%	11.5	7.6
<i>Brachycentrus occidentalis</i>	51	21	16	23	111	2%	27.8	15.8
<i>Micrasema sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Rhyacophila coloradensis gp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Glossosoma sp.</i>	0	0	3	1	4	0%	1.0	1.4
ANNELIDA					0%	1		
Naididae	2	2	0	0	4	0%	1.0	1.2
OTHER								
Turbellaria	43	50	73	81	247	4%	61.8	18.1
ID's by D. McGuire								
TOTAL ORGANISMS	1542	1493	1472	2076	6583		1646	288
TAXA RICHNESS	38	41	46	47	61		43.0	4.2
SHAN. DIVERSITY	3.92	3.89	3.94	3.80	4.00		3.89	0.06
BIOTIC INDEX	4.79	4.73	4.99	5.04	4.90		4.89	0.15
EPT RICHNESS	18	20	25	23	32		21.5	3.1
% R.A. DOMINANT	24%	33%	24%	23%	26%		26%	4.5%
% R.A. FILTERERS	39%	43%	34%	33%	37%		38%	5%
METALS TOLERANCE	4.28	4.39	4.52	4.49	4.43		4.42	0.11
Baetidae/Ephemeroptera	0.39	0.78	0.49	0.55	0.57		0.55	0.17
Hydropsychinae/Trichoptera	0.82	0.89	0.88	0.92	0.88		0.88	0.05
EPT / (EPT + CHIR.)	0.54	0.66	0.51	0.46	0.54		0.54	0.09
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	7%	16%	11%	12%	11%		11%	4%
SEDIMENT TOLERANT INDEX	5.91	5.75	5.96	6.28	6.00		5.97	0.22
FSBI	116	104	138	128	163		121.5	14.7

B.22 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Shuffields - STATION 18 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	19	
<i>Optioservus</i> spp.	2	1	0	2	5	0%	1.3	1.0
<i>Zaitzevia</i> sp.	13	7	45	7	72	1%	18.0	18.2
DIPTERA						16%	330	
<i>Thienemannimyia</i> gp.	4	1	7	1	13	0%	3.3	2.9
<i>Potthastia</i> spp.	4	13	1	7	25	0%	6.3	5.1
<i>Cardiocladius</i> spp.	17	13	9	18	57	1%	14.3	4.1
<i>Cricotopus</i> spp.	107	102	44	71	324	4%	81.0	29.4
<i>Cricotopus nostococladius</i>	12	46	20	28	106	1%	26.5	14.5
<i>Eukiefferiella</i> spp.	10	6	0	0	16	0%	4.0	4.9
<i>Nanocladius</i> sp.	3	1	2	1	7	0%	1.8	1.0
<i>Orthocladius</i> spp.	34	29	7	19	89	1%	22.3	11.9
<i>Tvetenia</i> sp.	27	20	19	13	79	1%	19.8	5.7
<i>Cryptochironomus</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Microtendipes</i> sp	6	0	0	11	17	0%	4.3	5.3
<i>Phaenopsectra</i> sp	0	0	4	0	4	0%	1.0	2.0
<i>Polypedilum</i> spp.	139	81	61	54	335	4%	83.8	38.6
<i>Cladotanytarsus</i> sp.	1	0	0	1	2	0%	0.5	0.6
<i>Rheotanytarsus</i> sp.	38	17	13	19	87	1%	21.8	11.1
<i>Micropsectra</i> spp.	10	4	30	6	50	1%	12.5	11.9
<i>Antocha</i> sp.	5	4	2	7	18	0%	4.5	2.1
<i>Atherix pachypus</i>	17	27	28	5	77	1%	19.3	10.7
<i>Simulium</i> spp.	0	6	0	0	6	0%	1.5	3.0
<i>Chelifera</i> sp.	2	0	0	0	2	0%	0.5	1.0
<i>Hemerodromia</i> sp.	6	0	0	0	6	0%	1.5	3.0
EPHEMEROPTERA						6%	130	
<i>Acentrella insignicans</i>	31	21	21	18	91	1%	22.8	5.7
<i>Baetis tricaudatus</i>	42	43	25	1	111	1%	27.8	19.7
<i>Diphotor hageni</i>	11	4	41	15	71	1%	17.8	16.2
<i>Attenella margarita</i>	3	2	7	5	17	0%	4.3	2.2
<i>Serratella tibialis</i>	0	0	4	2	6	0%	1.5	1.9
<i>Ephemerella inermis</i>	4	0	4	4	12	0%	3.0	2.0
<i>Heptagenia</i> sp.	16	2	2	2	22	0%	5.5	7.0
<i>Rhithrogena</i> sp.	1	0	1	3	5	0%	1.3	1.3
<i>Paraleptophlebia bicornuta</i>	1	0	6	1	8	0%	2.0	2.7
<i>Tricorythodes minutus</i>	31	10	98	39	178	2%	44.5	37.7
LEPIDOPTERA								
<i>Petrophila</i> sp.	194	138	98	165	595	7%	148.8	40.8
PLECOPTERA						1%	12	
<i>Claassenia sabulosa</i>	0	0	5	4	9	0%	2.3	2.6

B.22 MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Shuffields - STATION 18 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
<i>Hesperoperla pacifica</i>	1	0	6	0	7	0%	1.8	2.9
<i>Calineruria californica</i>	0	0	2	0	2	0%	0.5	1.0
<i>Isogenoides sp.</i>	0	0	8	1	9	0%	2.3	3.9
<i>Skwala sp.</i>	5	2	8	2	17	0%	4.3	2.9
<i>Pteronarcys californica</i>	3	1	0	0	4	0%	1.0	1.4
 TRICHOPTERA								
<i>Arctopsyche grandis</i>	76	23	105	19	223	3%	55.8	41.9
<i>Cheumatopsyche spp.</i>	176	107	318	178	779	10%	194.8	88.5
<i>Hydropsyche occidentalis</i>	1130	1010	630	477	3247	40%	811.8	308.6
<i>Hydropsyche (C) cockerelli</i>	204	184	205	133	726	9%	181.5	33.7
<i>Hydroptila spp.</i>	28	43	29	4	104	1%	26.0	16.2
<i>Leucotrichia pictipes</i>	0	3	0	2	5	0%	1.3	1.5
<i>Neotrichia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Ochrotrichia sp.</i>	18	27	2	2	49	1%	12.3	12.4
<i>Ceraclea sp.</i>	1	2	1	3	7	0%	1.8	1.0
<i>Oecetis sp.</i>	12	2	6	1	21	0%	5.3	5.0
<i>Psychomyia flava</i>	53	44	28	23	148	2%	37.0	13.9
<i>Brachycentrus occidentalis</i>	112	33	64	23	232	3%	58.0	40.0
<i>Protoptila sp.</i>	1	0	2	0	3	0%	0.8	1.0
<i>Glossosoma sp.</i>	1	0	2	0	3	0%	0.8	1.0
 MOLLUSCA								
<i>Ferrissia sp.</i>	0	0	0	3	3	0%	0.8	1.5
<i>Pisidium sp.</i>	0	0	1	0	1	0%	0.3	0.5
 OTHER								
Turbellaria	1	0	0	0	1	0%	0.3	0.5
ID's by D. McGuire								
TOTAL ORGANISMS	2613	2080	2022	1400	8115		2029	496
TAXA RICHNESS	46	38	45	43	57		43.0	3.6
SHAN. DIVERSITY	3.37	3.11	3.69	3.52	3.51		3.42	0.25
BIOTIC INDEX	4.75	4.86	4.52	4.84	4.74		4.74	0.15
EPT RICHNESS	24	20	27	24	30		23.8	2.9
% R.A. DOMINANT	43%	49%	31%	34%	40%		39%	8.1%
% R.A. FILTERERS	66%	66%	66%	61%	65%		65%	3%
METALS TOLERANCE	4.46	4.69	4.25	4.53	4.48		4.48	0.18
Baetidae/Ephemeroptera	0.60	0.83	0.42	0.38	0.52		0.56	0.21
Hydropsychinae/Trichoptera	0.83	0.88	0.83	0.91	0.86		0.86	0.04
EPT / (EPT + CHIR.)	0.83	0.82	0.88	0.79	0.83		0.83	0.04
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	9%	6%	23%	16%	13%		14%	8%
SEDIMENT TOLERANT INDEX	5.57	5.54	5.65	5.90	5.64		5.66	0.16
FSBI	125	93	119	104	138		110.3	14.5

B.23 MACROINVERTEBRATE DATA								
BITTERROOT RIVER near mouth - STATION 19 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						6%	56	
<i>Optioservus</i> spp.	75	20	57	12	164	5%	41.0	30.0
<i>Zaitzevia</i> sp.	33	8	15	4	60	2%	15.0	12.8
DIPTERA						26%	224	
<i>Thienemannimyia</i> gp.	1	0	1	3	5	0%	1.3	1.3
<i>Pagastia</i> sp	2	2	0	0	4	0%	1.0	1.2
<i>Potthastia</i> spp.	0	0	0	4	4	0%	1.0	2.0
<i>Cardiocladius</i> spp.	0	0	0	2	2	0%	0.5	1.0
<i>Cricotopus</i> spp.	11	17	36	12	76	2%	19.0	11.6
<i>Eukiefferiella</i> spp.	0	2	7	4	13	0%	3.3	3.0
<i>Orthocladius</i> spp.	1	4	22	6	33	1%	8.3	9.4
<i>Tvetenia</i> sp.	11	13	32	5	61	2%	15.3	11.7
<i>Microtendipes</i> sp	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum</i> spp.	39	5	50	5	99	3%	24.8	23.2
<i>Rheotanytarsus</i> sp.	246	96	156	65	563	16%	140.8	79.7
<i>Micropsectra</i> spp.	0	6	13	1	20	1%	5.0	5.9
<i>Antocha</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Simulium</i> spp.	0	1	8	0	9	0%	2.3	3.9
<i>Chelifera</i> sp.	1	0	3	1	5	0%	1.3	1.3
EPHEMEROPTERA						5%	41	
<i>Acentrella insignificans</i>	0	1	0	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	2	1	11	0	14	0%	3.5	5.1
<i>Diphetor hageni</i>	11	0	4	1	16	0%	4.0	5.0
<i>Attenella margarita</i>	4	2	3	0	9	0%	2.3	1.7
<i>Serratella tibialis</i>	9	5	22	7	43	1%	10.8	7.7
<i>Drunella grandis</i>	14	9	8	7	38	1%	9.5	3.1
<i>Epeorus albertae</i>	1	2	0	0	3	0%	0.8	1.0
<i>Heptagenia</i> sp.	3	0	0	0	3	0%	0.8	1.5
<i>Nixe</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Rhithrogena</i> sp.	2	2	7	0	11	0%	2.8	3.0
<i>Tricorythodes minutus</i>	10	6	4	3	23	1%	5.8	3.1
HEMIPTERA								
<i>Sigara</i> sp.	0	0	0	0	0	0%	0.0	0.0
LEPIDOPTERA								
<i>Petrophila</i> sp.	2	10	3	18	33	1%	8.3	7.4
ODONATA								
<i>Ophiogomphus</i> sp.	1	0	0	0	1	0%	0.3	0.5
PLECOPTERA						2%	18	

B.23 MACROINVERTEBRATE DATA								
BITTERROOT RIVER near mouth - STATION 19 -14 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
<i>Claassenia sabulosa</i>	5	2	11	3	21	1%	5.3	4.0
<i>Hesperoperla pacifica</i>	0	1	1	0	2	0%	0.5	0.6
<i>Isogenoides sp.</i>	1	0	2	0	3	0%	0.8	1.0
<i>Skwala sp.</i>	3	5	1	2	11	0%	2.8	1.7
<i>Pteronarcella badia</i>	1	8	20	3	32	1%	8.0	8.5
<i>Pteronarcys californica</i>	0	0	0	1	1	0%	0.3	0.5
 TRICHOPTERA								
<i>Arctopsyche grandis</i>	8	4	8	4	24	1%	6.0	2.3
<i>Cheumatopsyche spp.</i>	110	120	141	65	436	12%	109.0	32.1
<i>Hydropsyche occidentalis</i>	317	256	502	160	1235	35%	308.8	144.1
<i>Hydropsyche (C) cockerelli</i>	21	20	24	8	73	2%	18.3	7.0
<i>Hydropsyche oslari ?</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hydroptila spp.</i>	1	0	1	1	3	0%	0.8	0.5
<i>Zumatrichia notosa</i>	0	0	1	0	1	0%	0.3	0.5
<i>Ceraclea sp.</i>	3	1	0	0	4	0%	1.0	1.4
<i>Psychomyia flava</i>	0	0	0	1	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	8	5	4	5	22	1%	5.5	1.7
<i>Protoptila sp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Glossosoma sp.</i>	83	47	85	16	231	7%	57.8	32.9
 ANNELIDA								
Lumbricidae	10	10	6	1	27	1%	6.8	4.3
Lumbriculidae	0	0	0	2	2	0%	0.5	1.0
 OTHER								
Turbellaria	20	14	7	3	44	1%	11.0	7.5
Porifera	1	0	1	0	2	0%	0.5	0.6
ID's by D. McGuire								
TOTAL ORGANISMS	1072	705	1278	439	3494		874	374
TAXA RICHNESS	37	33	37	36	53		35.8	1.9
SHAN. DIVERSITY	3.32	3.27	3.34	3.41	3.43		3.34	0.06
BIOTIC INDEX	4.65	4.59	4.68	4.77	4.66		4.67	0.08
EPT RICHNESS	21	19	21	18	29		19.8	1.5
% R.A. DOMINANT	30%	36%	39%	36%	35%		35%	4.1%
% R.A. FILTERERS	66%	71%	66%	70%	68%		68%	3%
METALS TOLERANCE	3.57	4.02	4.12	4.06	3.93		3.94	0.25
Baetidae/Ephemeroptera	0.23	0.07	0.25	0.06	0.19		0.15	0.10
Hydropsychinae/Trichoptera	0.81	0.87	0.87	0.89	0.86		0.86	0.03
EPT / (EPT + CHIR.)	0.66	0.77	0.73	0.73	0.72		0.72	0.05
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	22%	22%	17%	19%	20%		20%	2%
SEDIMENT TOLERANT INDEX	5.66	5.78	5.82	5.88	5.77		5.79	0.09
FSBI	104	101	102	83	133		97.5	9.7

B 24

MACROINVERTEBRATE DATA

CLARK FORK RIVER at Harper Bridge - STATION 20 -15 AUG 2000

B.24 MACROINVERTEBRATE DATA							
CLARK FORK RIVER at Harper Bridge - STATION 20 -15 AUG 2000							
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN
<i>Ophiogomphus</i> sp.	0	0	1	1	2	0%	0.5
0.6							
PLECOPTERA						1%	6
<i>Claassenia sabulosa</i>	0	2	1	2	5	0%	1.3
1.0							
<i>Hesperoperla pacifica</i>	0	0	1	0	1	0%	0.3
0.5							
<i>Isogenoides</i> sp.	3	1	0	2	6	0%	1.5
1.3							
<i>Skwala</i> sp.	1	4	4	2	11	0%	2.8
1.5							
<i>Isoperla fulva</i>	0	0	1	0	1	0%	0.3
0.5							
TRICHOPTERA						35%	351
<i>Arctopsyche grandis</i>	1	0	0	4	5	0%	1.3
1.9							
<i>Cheumatopsyche</i> spp.	37	25	57	52	171	4%	42.8
14.6							
<i>Hydropsyche occidentalis</i>	107	73	500	310	990	25%	247.5
198.2							
<i>Hydropsyche (C) cockerelli</i>	7	0	6	5	18	0%	4.5
3.1							
<i>Hydropsyche oslari</i> ?	0	1	0	2	3	0%	0.8
1.0							
<i>Hydroptila</i> spp.	6	3	13	10	32	1%	8.0
4.4							
<i>Leucotrichia pictipes</i>	0	0	1	4	5	0%	1.3
1.9							
<i>Ceraclea</i> sp.	1	0	0	0	1	0%	0.3
0.5							
<i>Nectopsyche</i> sp.	0	1	0	0	1	0%	0.3
0.5							
<i>Oecetis</i> sp.	11	4	1	7	23	1%	5.8
4.3							
<i>Psychomyia flava</i>	14	0	5	3	22	1%	5.5
6.0							
<i>Brachycentrus occidentalis</i>	6	1	1	2	10	0%	2.5
2.4							
<i>Protoptila</i> sp.	0	1	0	0	1	0%	0.3
0.5							
<i>Glossosoma</i> sp.	25	18	42	35	120	3%	30.0
10.6							
ANNELIDA						0%	4
<i>Naididae</i>	1	2	0	10	13	0%	3.3
4.6							
<i>Tubificidae</i>	1	0	2	0	3	0%	0.8
1.0							
CRUSTACEA							
<i>Pacifasticus</i> sp.	0	0	0	1	1	0%	0.3
0.5							
ID's by D. McGuire							
TOTAL ORGANISMS	830	402	1696	1067	3995	999	540
TAXA RICHNESS	48	41	42	44	60	43.8	3.1
SHAN. DIVERSITY	4.33	4.17	3.61	3.79	4.04	3.98	0.33
BIOTIC INDEX	4.86	4.62	5.12	5.13	5.02	4.93	0.24
EPT RICHNESS	21	21	21	24	31	21.8	1.5
% R.A. DOMINANT	14%	18%	29%	29%	25%	23%	7.8%
% R.A. FILTERERS	25%	31%	38%	42%	36%	34%	7%
METALS TOLERANCE	4.15	3.88	5.06	4.66	4.65	4.44	0.53
Baetidae/Ephemeroptera	0.04	0.04	0.49	0.18	0.27	0.19	0.21
Hydropsychinae/Trichoptera	0.70	0.78	0.90	0.85	0.84	0.81	0.09
EPT / (EPT + CHIR.)	0.55	0.65	0.58	0.56	0.57	0.58	0.05
Experimental Sediment Metrics							
% SEDIMENT TOLERANT	16%	20%	12%	11%	13%	15%	4%
SEDIMENT TOLERANT INDEX	6.36	6.16	6.13	6.23	6.21	6.22	0.10
FSBI	112	96	106	103	140	104.3	6.7

B.26

MACROINVERTEBRATE DATA

CLARK FORK RIVER near Superior - STATION 24 -15 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	39	
<i>Optioservus spp.</i>	7	8	21	6	42	1%	10.5	7.0
<i>Zaitzevia sp.</i>	30	27	41	16	114	3%	28.5	10.3
<i>Deronectes sp.</i>	0	1	0	0	1	0%	0.3	0.5
DIPTERA						18%	169	
<i>Thienemannimyia gp.</i>	7	5	19	2	33	1%	8.3	7.5
<i>Diamesa spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pagastia sp</i>	1	0	0	0	1	0%	0.3	0.5
<i>Potthastia spp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Cricotopus spp.</i>	0	0	39	3	42	1%	10.5	19.1
<i>Eukiefferiella spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Orthocladius spp.</i>	0	0	0	4	4	0%	1.0	2.0
<i>Tvetenia sp.</i>	19	1	95	28	143	4%	35.8	41.1
<i>Polypedilum spp.</i>	15	8	130	43	196	5%	49.0	56.1
<i>Rheotanytarsus sp.</i>	13	3	38	12	66	2%	16.5	15.0
<i>Micropsectra spp.</i>	18	56	56	48	178	5%	44.5	18.1
<i>Antocha sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hexatoma sp.</i>	0	4	1	1	6	0%	1.5	1.7
<i>Simulium spp.</i>	0	0	2	0	2	0%	0.5	1.0
EPHEMEROPTERA						10%	96	
<i>Acentrella insignicans</i>	0	2	4	0	6	0%	1.5	1.9
<i>Baetis tricaudatus</i>	9	5	24	5	43	1%	10.8	9.0
<i>Diphetor hageni</i>	1	8	6	0	15	0%	3.8	3.9
<i>Attenella margarita</i>	4	7	2	0	13	0%	3.3	3.0
<i>Serratella tibialis</i>	19	5	22	17	63	2%	15.8	7.5
<i>Ephemerella inermis</i>	2	2	116	10	130	3%	32.5	55.8
<i>Drunella grandis</i>	9	3	4	7	23	1%	5.8	2.8
<i>Timpango hecuba</i>	0	0	1	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	7	4	11	1	23	1%	5.8	4.3
<i>Nixe sp.</i>	0	1	3	0	4	0%	1.0	1.4
<i>Rhithrogena sp.</i>	9	15	7	9	40	1%	10.0	3.5
<i>Paraleptophlebia bicornuta</i>	6	1	15	0	22	1%	5.5	6.9
<i>Tricorythodes minutus</i>	0	1	1	0	2	0%	0.5	0.6
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	0	1	0	1	0%	0.3	0.5
PLECOPTERA						2%	16	
<i>Claassenia sabulosa</i>	5	7	12	7	31	1%	7.8	3.0
<i>Hesperoperla pacifica</i>	0	0	2	1	3	0%	0.8	1.0
<i>Isogenoides sp.</i>	11	8	6	2	27	1%	6.8	3.8
<i>Skwala sp.</i>	1	0	1	0	2	0%	0.5	0.6

B.26 MACROINVERTEBRATE DATA								
CLARK FORK RIVER near Superior - STATION 24 -15 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
<i>Isoperla fulva</i>	1	0	1	0	2	0%	0.5	0.6
TRICHOPTERA								
<i>Arctopsyche grandis</i>	1	1	5	1	8	0%	2.0	2.0
<i>Cheumatopsyche spp.</i>	252	102	478	160	992	27%	248.0	165.3
<i>Hydropsyche occidentalis</i>	121	36	433	149	739	20%	184.8	172.3
<i>Hydropsyche (C) cockerelli</i>	83	32	216	77	408	11%	102.0	79.3
<i>Hydropsyche oslari ?</i>	1	3	3	9	16	0%	4.0	3.5
<i>Hydroptila spp.</i>	2	0	7	1	10	0%	2.5	3.1
<i>Ceraclea sp.</i>	3	4	0	0	7	0%	1.8	2.1
<i>Oecetis sp.</i>	10	3	1	5	19	1%	4.8	3.9
<i>Psychomyia flava</i>	0	1	0	0	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	12	3	9	3	27	1%	6.8	4.5
<i>Protoptila sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Glossosoma sp.</i>	42	41	23	78	184	5%	46.0	23.1
ANNELIDA								
Lumbricidae	8	2	0	0	10	0%	2.5	3.8
Lumbriculidae	1	1	2	0	4	0%	1.0	0.8
MOLLUSCA								
<i>Physella sp.</i>	0	0	1	0	1	0%	0.3	0.5
OTHER								
Turbellaria	1	2	0	0	3	0%	0.8	1.0
ID's by D. McGuire								
TOTAL ORGANISMS	732	415	1860	708	3715		929	637
TAXA RICHNESS	35	38	41	31	52		36.3	4.3
SHAN. DIVERSITY	3.48	3.92	3.46	3.50	3.68		3.59	0.22
BIOTIC INDEX	4.22	3.76	4.67	4.09	4.37		4.19	0.38
EPT RICHNESS	24	25	27	18	30		23.5	3.9
% R.A. DOMINANT	34%	25%	26%	23%	27%		27%	5.2%
% R.A. FILTERERS	66%	43%	64%	58%	61%		58%	10%
METALS TOLERANCE	4.03	3.44	4.30	3.91	4.08		3.92	0.36
Baetidae/Ephemeroptera	0.15	0.28	0.16	0.10	0.17		0.17	0.07
Hydropsychinae/Trichoptera	0.87	0.76	0.96	0.82	0.89		0.85	0.08
EPT / (EPT + CHIR.)	0.89	0.80	0.79	0.79	0.81		0.82	0.05
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	41%	35%	29%	26%	31%		33%	7%
SEDIMENT TOLERANT INDEX	6.24	6.18	6.32	6.09	6.24		6.21	0.10
FSI	106	109	131	99	137		111.3	13.8

B.27 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead River - STATION 25 -15 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	10	
<i>Optioservus spp.</i>	2	1	3	0	6	0%	1.5	1.3
<i>Zaitzevia sp.</i>	14	10	6	4	34	1%	8.5	4.4
DIPTERA						42%	441	
<i>Thienemannimyia gp.</i>	7	1	4	6	18	0%	4.5	2.6
<i>Pagastia sp</i>	0	0	3	0	3	0%	0.8	1.5
<i>Cricotopus spp.</i>	37	11	35	5	88	2%	22.0	16.4
<i>Eukiefferiella spp.</i>	0	0	1	1	2	0%	0.5	0.6
<i>Orthocladius spp.</i>	0	3	6	0	9	0%	2.3	2.9
<i>Tvetenia sp.</i>	38	14	16	7	75	2%	18.8	13.4
<i>Microtendipes sp</i>	15	4	10	3	32	1%	8.0	5.6
<i>Polypedilum spp.</i>	7	10	25	9	51	1%	12.8	8.3
<i>Xenochironomus sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Cladotanytarsus sp.</i>	0	8	1	0	9	0%	2.3	3.9
<i>Rheotanytarsus sp.</i>	342	422	340	265	1369	32%	342.3	64.1
<i>Tanytarsus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	19	29	18	30	96	2%	24.0	6.4
<i>Antocha sp.</i>	1	2	2	3	8	0%	2.0	0.8
<i>Atherix pachypus</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium spp.</i>	0	1	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						6%	63	
<i>Acentrella insignicans</i>	4	7	15	7	33	1%	8.3	4.7
<i>Baetis tricaudatus</i>	5	2	12	0	19	0%	4.8	5.3
<i>Attenella margarita</i>	3	2	4	0	9	0%	2.3	1.7
<i>Serratella tibialis</i>	2	4	2	4	12	0%	3.0	1.2
<i>Ephemerella inermis</i>	3	0	8	0	11	0%	2.8	3.8
<i>Drunella grandis</i>	6	7	9	9	31	1%	7.8	1.5
<i>Timpango hecuba</i>	2	0	0	1	3	0%	0.8	1.0
<i>Epeorus albertae</i>	23	1	11	1	36	1%	9.0	10.5
<i>Heptagenia sp.</i>	38	10	26	14	88	2%	22.0	12.6
<i>Paraleptophlebia bicornuta</i>	1	3	5	2	11	0%	2.8	1.7
LEPIDOPTERA								
<i>Petrophila sp.</i>	12	28	6	21	67	2%	16.8	9.7
PLECOPTERA						0%	5	
<i>Claassenia sabulosa</i>	0	2	6	1	9	0%	2.3	2.6
<i>Hesperoperla pacifica</i>	1	0	2	1	4	0%	1.0	0.8
<i>Isogenoides sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Skwala sp.</i>	0	1	0	2	3	0%	0.8	1.0

B.27 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead River - STATION 25 -15 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						47%	497	
<i>Arctopsyche grandis</i>	4	7	7	7	25	1%	6.3	1.5
<i>Cheumatopsyche spp.</i>	302	165	225	192	884	21%	221.0	59.3
<i>Hydropsyche occidentalis</i>	125	90	155	79	449	11%	112.3	34.6
<i>Hydropsyche (C) cockerelli</i>	103	80	126	81	390	9%	97.5	21.8
<i>Hydropsyche oslari ?</i>	1	1	1	0	3	0%	0.8	0.5
<i>Dicosmoecus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Hydroptila spp.</i>	0	1	1	1	3	0%	0.8	0.5
<i>Leucotrichia pictipes</i>	3	2	4	14	23	1%	5.8	5.6
<i>Zumatrixchia notosa</i>	0	0	2	0	2	0%	0.5	1.0
<i>Ceraclea spp.</i>	17	2	11	4	34	1%	8.5	6.9
<i>Oecetis sp.</i>	2	1	1	0	4	0%	1.0	0.8
<i>Psychomyia flava</i>	38	28	45	45	156	4%	39.0	8.0
<i>Brachycentrus occidentalis</i>	0	2	2	0	4	0%	1.0	1.2
<i>Protoptila sp.</i>	1	0	5	0	6	0%	1.5	2.4
<i>Glossosoma sp.</i>	0	1	1	0	2	0%	0.5	0.6
ANNELIDA						1%	14	
Lumbricidae	38	4	9	6	57	1%	14.3	16.0
MOLLUSCA						0%	1	
<i>Physella sp.</i>	2	0	1	0	3	0%	0.8	1.0
<i>Ferrissia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pisidium sp.</i>	0	0	1	0	1	0%	0.3	0.5
OTHER								
Turbellaria	5	9	1	5	20	0%	5.0	3.3
Porifera	1	1	1	1	4	0%	1.0	0.0
ID's by D. McGuire								
TOTAL ORGANISMS	1225	979	1178	833	4215		1054	182
TAXA RICHNESS	37	41	48	34	54		40.0	6.1
SHAN. DIVERSITY	3.37	3.04	3.52	3.22	3.39		3.29	0.20
BIOTIC INDEX	4.94	5.14	4.90	4.83	4.95		4.95	0.13
EPT RICHNESS	22	22	27	18	29		22.3	3.7
% R.A. DOMINANT	28%	43%	29%	32%	32%		33%	7.0%
% R.A. FILTERERS	72%	78%	73%	75%	74%		74%	3%
METALS TOLERANCE	3.20	2.71	3.24	2.89	3.04		3.01	0.25
Baetidae/Ephemeroptera	0.10	0.25	0.29	0.18	0.21		0.21	0.08
Hydropsychinae/Trichoptera	0.89	0.88	0.87	0.83	0.87		0.87	0.03
EPT / (EPT + CHIR.)	0.60	0.45	0.60	0.59	0.56		0.56	0.07
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	28%	18%	21%	24%	22%		23%	4%
SEDIMENT TOLERANT INDEX	6.49	6.18	6.23	6.25	6.30		6.29	0.14
FSBI	93	107	116	85	130		100.3	13.9

B.28

MACROINVERTEBRATE DATA

CLARK FORK RIVER above Thompson Falls Reservoir - STATION 27 -15 AUG 2000

Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	4	
<i>Optioservus spp.</i>	0	0	0	3	3	0%	0.8	1.5
<i>Zaitzevia sp.</i>	1	0	3	5	9	1%	2.3	2.2
<i>Oreodytes spp.</i>	4	0	1	0	5	0%	1.3	1.9
DIPTERA						4%	11	
<i>Cricotopus spp.</i>	0	1	6	3	10	1%	2.5	2.6
<i>Orthocladius spp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Synorthocladius sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Tvetenia sp.</i>	0	0	5	1	6	1%	1.5	2.4
<i>Microtendipes sp</i>	4	1	0	0	5	0%	1.3	1.9
<i>Stenochironomus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	4	0	2	0	6	1%	1.5	1.9
<i>Xenochironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cladotanytarsus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	0	1	2	5	8	1%	2.0	2.2
<i>Hemerodromia sp.</i>	0	0	2	0	2	0%	0.5	1.0
EPHEMEROPTERA						9%	23	
<i>Acentrella insignicans</i>	0	0	1	0	1	0%	0.3	0.5
<i>Diphetor hageni</i>	0	0	1	0	1	0%	0.3	0.5
<i>Serratella tibialis</i>	0	1	0	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	2	1	2	1	6	1%	1.5	0.6
<i>Heptagenia sp.</i>	8	6	5	2	21	2%	5.3	2.5
<i>Stenonema sp.</i>	28	9	14	12	63	6%	15.8	8.4
LEPIDOPTERA								
<i>Petrophila sp.</i>	7	12	3	3	25	2%	6.3	4.3
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	0	1	1	0%	0.3	0.5
PLECOPTERA						1%	2	
<i>Claassenia sabulosa</i>	0	1	1	3	5	0%	1.3	1.3
<i>Isogenoides sp.</i>	0	0	1	0	1	0%	0.3	0.5

B.28 MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Thompson Falls Reservoir - STATION 27 -15 AUG 2000								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S.D.
TRICHOPTERA						71%	184	
<i>Cheumatopsyche</i> spp.	46	71	77	174	368	36%	92.0	56.3
<i>Hydropsyche occidentalis</i>	6	2	7	2	17	2%	4.3	2.6
<i>Hydropsyche (C) cockerelli</i>	9	31	44	68	152	15%	38.0	24.7
<i>Hydroptila</i> spp.	0	0	0	1	1	0%	0.3	0.5
<i>Ceraclea</i> sp.	2	4	6	17	29	3%	7.3	6.7
<i>Oecetis</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Psychomyia flava</i>	0	0	1	0	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	0	0	0	2	2	0%	0.5	1.0
<i>Polycentropus</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Protoptila</i> sp.	1	0	4	2	7	1%	1.8	1.7
<i>Glossosoma</i> sp.	17	24	85	29	155	15%	38.8	31.2
ANNELIDA						0%	0	
Lumbriculidae	0	0	1	0	1	0%	0.3	0.5
CRUSTACEA								
<i>Gammarus</i> sp.	1	0	0	0	1	0%	0.3	0.5
MOLLUSCA						11%	28	
<i>Physella</i> sp.	0	1	0	1	2	0%	0.5	0.6
<i>Ferrissia</i> sp.	0	0	4	5	9	1%	2.3	2.6
<i>Gyraulus</i> sp.	8	2	11	1	22	2%	5.5	4.8
<i>Fossaria</i> sp.	10	6	5	32	53	5%	13.3	12.7
<i>Fisherola nuttalli</i>	1	4	9	10	24	2%	6.0	4.2
OTHER								
Turbellaria	0	2	0	1	3	0%	0.8	1.0
ID's by D. McGuire								
TOTAL ORGANISMS	160	181	305	388	1034		259	107
TAXA RICHNESS	19	20	29	29	43		24.3	5.5
SHAN. DIVERSITY	3.38	2.94	3.31	2.88	3.34		3.13	0.25
BIOTIC INDEX	4.34	4.03	3.38	4.36	4.01		4.03	0.46
EPT RICHNESS	9	10	14	14	19		11.8	2.6
% R.A. DOMINANT	29%	39%	28%	45%	36%		35%	8.3%
% R.A. FILTERERS	38%	58%	43%	65%	53%		51%	13%
METALS TOLERANCE	3.16	3.57	3.28	3.76	3.49		3.44	0.27
Baetidae/Ephemeroptera	0.00	0.00	0.09	0.00	0.02		0.02	0.04
Hydropsychinae/Trichoptera	0.75	0.79	0.57	0.82	0.73		0.73	0.11
EPT / (EPT + CHIR.)	0.93	0.97	0.94	0.97	0.95		0.95	0.02
Experimental Sediment Metrics								
% SEDIMENT TOLERANT	31%	41%	28%	52%	37%		38%	11%
SEDIMENT TOLERANT INDEX	6.43	6.31	5.76	6.60	6.28		6.28	0.36
FSBI	31	31	46	45	65		38.3	8.4

APPENDIX C:

Metric values and bioassessment scores for Clark Fork Basin monitoring stations, 1986-2000

**C-1. Mean metric values and bioassessment scores for Blacktail Creek above Grove Gulch:
Station SF-1, August, 1993-2000 (4 Hess samples per year).**

	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values									
Taxa richness	30	35	31	27	23	29	31	35	30
Shannon diversity	1.9	3.3	3.0	3.0	3.0	3.3	3.3	3.6	3.0
EPT/EPTC	0.20	0.76	0.54	0.87	0.75	0.86	0.73	0.62	0.67
Hydropsychinae/Trichoptera	0.58	0.97	1.00	0.99	0.99	0.96	0.89	0.82	0.90
Baetidae/Ephemeroptera	0.40	0.92	0.90	0.94	0.96	0.89	0.88	0.71	0.83
Biotic index	6.3	4.3	4.1	4.1	4.5	4.2	4.5	3.9	4.5
% Filterer	67	47	57	65	66	55	49	15	53
Density	1648	1670	2566	1147	1173	921	1176	1434	1467
EPT richness	10	13	10	12	9	13	12	13	11
Metals Tolerance index	6.6	6.0	5.5	6.0	6.0	5.5	5.5	5.1	5.8
Metric scores									
Taxa richness	4	5	4	3	2	3	4	5	4
Shannon diversity	2	5	5	5	5	5	5	6	5
EPT/EPTC	2	6	5	6	6	6	6	6	5
Hydropsychinae/Trichoptera	6	1	0	1	1	2	4	6	3
Baetidae/Ephemeroptera	6	3	4	2	2	4	4	6	4
Biotic index	2	5	5	5	5	5	5	6	5
% Filterer	2	6	4	3	2	5	6	6	4
Density (high)	6	6	5	6	6	6	6	6	6
Density (low)	6	6	6	6	6	6	6	6	6
EPT richness	3	3	3	3	2	3	3	3	3
Metals Tolerance index	3	3	4	3	3	4	4	4	4
Total	42	49	45	43	40	49	53	60	48
Organic subset	10	17	14	14	13	16	17	18	15
Metals subset	12	12	13	12	11	13	13	13	12
Bioassessment									
Overall	64%	74%	68%	65%	61%	74%	80%	91%	72%
Organic subset	56%	94%	78%	78%	72%	89%	94%	100%	83%
Metals subset	67%	67%	72%	67%	61%	72%	72%	72%	69%

**C-2. Mean metric values and bioassessment scores for Silver Bow Creek above the Butte WWTP:
Station 00 - August, 1987-2000 (four Hess samples per year).**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values															
Taxa richness	5	6	6	7	9	10	8	14	10	12	17	16	17	26	12
Shannon diversity	1.6	2.3	0.9	1.4	1.8	1.4	1.7	1.7	1.8	2.1	2.7	2.1	1.7	2.3	1.8
EPT/EPTC	0.03	0.03	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.14	0.35	0.06	0.13	0.14	0.07
Hydropsychinae/Trichoptera	1.00	0.75	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.96	0.72	0.96	0.96
Baetidae/Ephemeroptera	1.00	1.00	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	0.98
Biotic index	4.9	5.1	6.6	5.7	4.9	6.3	5.0	5.7	5.4	5.2	4.5	5.6	6.3	6.1	5.5
% Filterer	0	2	1	0	0	0	1	2	1	13	34	19	22	12	8
Density	26	46	175	362	344	167	247	607	278	367	378	349	682	707	338
EPT richness	0	1	0	1	1	1	1	2	1	3	6	5	5	7	2
Metals Tolerance index	9.3	9.2	9.7	9.4	9.2	9.3	9.4	9.4	9.1	8.9	8.0	8.4	8.9	8.2	9.0
Metric scores															
Taxa richness	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Shannon diversity	1	3	0	0	2	0	1	1	2	2	4	2	1	3	2
EPT/EPTC	0	0	0	0	0	0	0	0	0	1	4	1	1	1	1
Hydropsychinae/Trichoptera	0	6	0	0	0	0	0	0	2	0	1	0	2	6	1
Baetidae/Ephemeroptera	0	0	0	0	6	0	0	0	0	0	0	0	2	0	1
Biotic index	4	4	1	3	4	2	4	3	3	3	5	3	2	2	3
% Filterer	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Density (high)	*	*	*	*	*	*	*	6	*	*	*	*	*	6	6
Density (low)	0	0	2	4	3	2	2	6	3	4	4	3	6	6	3
EPT richness	0	0	0	0	0	0	0	1	0	1	2	1	1	2	1
Metals Tolerance index	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Total	11	19	9	13	21	10	13	23	16	18	28	20	27	36	19
Organic subset	10	10	7	9	10	8	10	15	9	9	11	9	14	14	10
Metals subset	0	0	2	4	3	2	2	7	3	6	7	5	8	9	4
Bioassessment															
Overall	18%	32%	15%	22%	35%	17%	22%	35%	27%	30%	47%	33%	41%	55%	30%
Organic subset	83%	83%	58%	75%	83%	67%	83%	75%	75%	92%	75%	78%	78%	78%	78%
Metals subset	0%	0%	11%	22%	17%	11%	11%	39%	17%	33%	39%	28%	44%	50%	23%

* not calculated if density is < 550

**C-3. Mean metric values and bioassessment scores for Silver Bow Creek below Butte WWTP:
Station 01 - August, 1986-2000 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	7	6	11	5	7	11	11	8	11	9	7	10	12	12	9	9
Shannon diversity	1.1	1.7	1.5	1.0	1.2	2.1	2.0	1.2	0.7	1.9	1.1	1.4	1.2	1.5	1.4	1.4
EPT/EPTC	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydropsychinae/Trichoptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baetidae/Ephemeroptera	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Biotic index	6.9	6.3	6.0	6.9	6.8	6.5	7.4	6.9	7.1	6.0	6.9	6.5	7.0	8.1	7.1	6.8
% Filterer	55	3	59	73	69	28	51	77	87	2	57	11	71	40	72	50
Density	628	118	1450	361	1763	473	315	2663	882	426	1588	306	965	1433	738	941
EPT richness	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Metals Tolerance index	8.3	9.3	7.8	7.7	7.8	8.9	7.8	7.5	7.2	8.9	8.3	9.4	7.7	6.9	7.2	8.0
Metric scores																
Taxa richness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shannon diversity	0	1	1	0	0	2	2	0	0	2	0	1	0	1	1	1
EPT/EPTC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydropsychinae/Trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baetidae/Ephemeroptera	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biotic index	1	2	2	1	1	1	0	1	0	2	1	1	0	0	0	1
% Filterer	5	6	4	1	2	6	5	0	0	6	4	6	1	6	1	4
Density (high)	6	*	6	*	6	*	6	*	4	6	*	6	*	6	6	6
Density (low)	6	1	6	4	6	5	3	6	6	4	6	3	6	6	6	5
EPT richness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metals Tolerance index	1	0	2	2	2	1	2	2	2	1	1	0	2	3	2	2
Total	25	10	21	8	17	15	12	13	14	15	18	11	15	22	16	18
Organic subset	12	8	12	2	9	7	5	5	6	8	11	7	7	12	7	10
Metals subset	7	1	8	6	8	6	5	8	8	5	7	3	8	9	8	6
Bioassessment																
Overall	38%	17%	32%	13%	26%	25%	20%	20%	21%	25%	27%	18%	23%	33%	24%	24%
Organic subset	67%	67%	67%	17%	50%	58%	42%	28%	33%	67%	61%	58%	39%	67%	39%	51%
Metals subset	39%	6%	44%	33%	44%	33%	28%	44%	44%	28%	39%	17%	44%	50%	44%	36%

* not calculated if density is < 550

**C-4. Mean metric values and bioassessment scores for Silver Bow Creek near Opportunity:
Station 02.5* - August 1986-2000 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	9	11	14	11	8	11	16	13	14	10	19	5	10	10	13	12
Shannon diversity	2.1	2.3	2.1	2.6	2.2	2.3	2.9	1.7	2.3	2.2	2.4	1.2	2.0	2.4	2.4	2.2
EPT/EPTC	0.63	0.27	0.74	0.44	0.52	0.51	0.75	0.11	0.65	0.18	0.66	0.21	0.26	0.46	0.56	0.46
Hydropsychinae/Trichoptera	0.98	0.87	0.98	0.86	0.89	0.89	0.98	0.93	0.16	0.66	0.99	0.49	0.34	0.53	0.24	0.72
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.98
Biotic index	4.0	4.9	5.4	3.8	4.3	4.7	4.6	4.3	4.1	4.5	3.6	4.3	4.3	3.2	3.5	4.2
% Filterer	53	21	73	39	51	51	71	12	77	18	62	21	25	45	67	46
Density	82	120	378	189	147	220	396	399	640	157	321	176	158	115	431	262
EPT richness	3	3	5	5	3	4	7	4	5	3	8	3	4	3	4	4
Metals Tolerance index	7.0	8.0	6.7	7.5	7.4	7.5	6.0	8.6	6.2	8.3	6.8	8.1	7.8	7.1	6.5	7.3
Metric scores																
Taxa richness	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Shannon diversity	2	3	2	4	3	3	4	1	3	3	3	0	2	3	3	3
EPT/EPTC	6	3	6	4	5	5	6	1	6	2	6	2	3	5	6	4
Hydropsychinae/Trichoptera	1	5	1	5	4	4	1	3	6	6	1	6	6	6	6	4
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	0	6	0	2	0	0	0	0	1
Biotic index	5	4	3	6	5	4	4	5	5	5	6	5	5	6	6	5
% Filterer	5	6	1	6	5	5	1	6	0	6	3	6	6	6	2	4
Density (high)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6
Density (low)	1	1	4	2	1	2	4	4	6	2	3	2	2	1	4	3
EPT richness	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1
Metals Tolerance index	2	1	3	2	2	2	3	1	3	1	3	1	2	2	3	2
Total	23	24	21	30	26	26	28	36	26	30	23	27	30	31	27	
Organic subset	10	10	4	12	10	9	5	11	11	11	9	11	11	12	8	10
Metals subset	4	3	8	5	4	5	9	6	10	4	8	4	5	4	8	6
Bioassessment																
Overall	38%	40%	35%	50%	43%	43%	47%	55%	43%	50%	38%	45%	50%	52%	45%	
Organic subset	83%	83%	33%	100%	83%	75%	42%	92%	61%	92%	75%	92%	100%	67%	78%	
Metals subset	22%	17%	44%	28%	22%	28%	50%	33%	56%	22%	44%	22%	28%	22%	44%	32%

1986- 1992 data from Station 03.

* not calculated if density is < 550

**C-5. Mean metric values and bioassessment scores for Silver Bow Creek below Warm Springs Ponds:
Station 04.5* - August, 1986-2000 (4 samples per year).**

	1986	1987	1988	1989	1990	1991	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values															
Taxa richness	16	16	18	16	13	16	29	30	27	30	33	35	36	42	25
Shannon diversity	2.4	1.6	2.5	2.7	2.1	1.9	3.0	3.2	2.9	2.5	2.0	2.4	3.6	3.6	2.6
EPT/EPTC	0.96	0.98	0.97	0.92	0.99	1.00	0.93	0.88	0.74	0.88	0.87	0.93	0.70	0.70	0.89
Hydropsychinae/Trichoptera	1.00	1.00	1.00	0.97	1.00	1.00	0.87	0.85	0.90	0.94	0.98	0.98	0.88	0.87	0.95
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.90	0.80	0.26	0.23	0.52	0.84
Biotic index	6.3	5.1	5.8	5.9	5.0	5.1	5.5	4.8	5.4	5.1	5.2	5.2	5.5	5.4	5.4
% Filterer	66	94	75	79	93	90	32	51	58	75	79	80	27	44	67
Density	2558	1648	2563	2574	3223	1952	940	3018	3609	3090	3517	3345	2065	2983	2649
EPT richness	4	5	4	6	6	5	8	12	8	13	13	13	12	19	9
Metals Tolerance index	5.1	5.4	5.1	5.8	5.4	5.8	4.6	5.4	6.1	5.2	5.3	5.1	4.6	4.5	5.2
Metric scores															
Taxa richness	1	1	1	0	1	0	3	4	3	4	4	5	5	6	3
Shannon diversity	3	1	3	4	2	2	5	5	4	3	2	3	6	6	4
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	0	0	0	1	0	0	5	5	4	2	1	1	4	5	2
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	0	0	1	4	6	6	6	2
Biotic index	2	4	2	2	4	4	3	4	3	4	3	3	3	3	3
% Filterer	2	0	1	0	0	0	6	5	4	1	0	0	6	6	2
Density (high)	5	6	5	5	3	6	6	4	3	4	3	3	5	4	4
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
EPT richness	1	1	1	2	2	1	2	3	2	3	3	3	3	5	2
Metals Tolerance index	4	4	4	4	4	4	5	4	3	4	4	4	5	5	4
Total	30	29	29	31	27	30	47	46	39	41	38	40	55	58	39
Organic subset	9	10	8	7	7	10	15	13	10	9	6	6	14	13	10
Metals subset	11	11	11	12	12	11	13	13	11	13	13	13	14	16	12
Bioassessment															
Overall	45%	44%	44%	47%	41%	45%	71%	70%	59%	62%	58%	61%	83%	88%	58%
Organic subset	50%	56%	44%	39%	39%	56%	83%	72%	56%	50%	33%	33%	78%	72%	54%
Metals subset	61%	61%	61%	67%	67%	61%	72%	72%	61%	72%	72%	78%	78%	89%	69%

* 1986-91 data from station 04.

C-6. Mean metric values and bioassessment scores for the Mill-Willow Bypass Station 05* - August, 1986-1991 and 1999-2000 (4 samples per year).

	1986	1987	1988	1989	1990	1991	1999	2000	Mean
Metric values									
Taxa richness	25	21	22	23	17	37	42	27	
Shannon diversity	3.2	2.9	3.0	2.9	2.4	3.4	3.6	3.1	
EPT/EPTC	0.86	0.97	0.91	0.86	0.80	0.82	0.70	0.85	
Hydropsychinae/Trichoptera	0.96	0.88	0.85	0.92	0.98	0.20	0.19	0.71	
Baetidae/Ephemeroptera	0.98	1.00	1.00	0.96	0.97	0.33	0.61	0.84	
Biotic index	4.6	4.7	4.3	5.2	5.6	3.8	4.8	4.7	
% Filterer	63	74	63	72	67	13	11	52	
Density	357	822	869	1376	408	762	1397	856	
EPT richness	11	10	8	10	7	22	20	13	
Metals Tolerance index	5.2	5.1	5.3	5.6	6.8	4.1	4.1	5.2	
Metric scores									
Taxa richness	3	2	2	2	1	5	6	3	
Shannon diversity	5	4	5	4	3	6	6	5	
EPT/EPTC	6	6	6	6	6	6	6	6	
Hydropsychinae/Trichoptera	2	4	5	3	1	6	6	4	
Baetidae/Ephemeroptera	1	0	0	2	1	6	6	2	
Biotic index	4	4	5	3	3	6	4	4	
% Filterer	3	1	3	1	2	6	6	3	
Density (high)	*	6	6	6	*	6	6	6	
Density (low)	4	6	6	6	4	6	6	5	
EPT richness	3	3	2	3	2	6	5	3	
Metals Tolerance index	4	4	4	4	3	5	5	4	
Total	35	40	44	40	26	64	62	44	
Organic subset	7	11	14	10	5	18	16	12	
Metals subset	11	13	12	13	9	17	16	13	
Bioassessment									
Overall	58%	61%	67%	61%	43%	97%	94%	69%	
Organic subset	58%	61%	78%	56%	42%	100%	89%	69%	
Metals subset	61%	72%	67%	72%	50%	94%	89%	72%	

* 1999-2000 data from reconstructed channel.

**C-7. Mean metric values and bioassessment scores for Warm Springs Creek near mouth:
Station 06 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values															
Taxa richness	17	24	26	27	29	30	30	32	30	34	31	35	38	41	30
Shannon diversity	3.3	3.6	3.8	3.5	3.6	3.5	3.1	3.8	3.5	3.9	3.8	3.7	3.9	3.4	3.6
EPT/EPTC	0.91	0.66	0.78	0.75	0.60	0.85	0.32	0.64	0.33	0.74	0.79	0.77	0.56	0.35	0.65
Hydropsychinae/Trichoptera	0.82	0.69	0.23	0.58	0.86	0.87	0.10	0.75	0.08	0.40	0.16	0.13	0.34	0.74	0.48
Baetidae/Ephemeroptera	0.97	0.64	0.12	0.92	0.90	0.53	0.88	0.83	0.92	0.82	0.65	0.88	0.78	0.93	0.77
Biotic index	3.7	4.1	5.2	4.5	4.8	4.2	4.2	4.0	4.2	4.1	3.4	3.6	4.2	4.4	4.2
% Filterer	20	20	9	20	26	49	34	40	21	21	39	38	33	32	24
Density	122	277	255	620	486	581	492	759	441	526	349	415	566	1848	553
EPT richness	10	11	13	13	13	14	12	15	13	18	18	21	23	20	15
Metals Tolerance index	4.5	5.1	3.8	5.2	5.6	4.9	4.5	4.1	4.3	4.4	3.8	3.7	4.2	3.5	4.4
Metric scores															
Taxa richness	1	2	3	3	3	4	4	4	4	4	4	4	5	5	4
Shannon diversity	5	6	6	6	6	6	5	6	6	6	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	3	6	3	6	6	6	6	4	5
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	1	6	6	3	4	6	4	6	3	6	6	4	6	6	5
Biotic index	6	5	3	5	4	5	5	5	5	6	6	6	5	5	5
% Filterer	*	*	*	6	6	*	6	*	6	*	*	*	6	6	6
Density (high)	1	3	3	6	5	6	5	6	4	5	3	4	6	6	5
Density (low)	3	3	3	3	4	3	4	3	4	3	5	6	6	5	4
EPT richness	5	4	6	4	4	5	5	5	5	6	6	6	5	6	5
Metals Tolerance index															
Total	40	47	48	54	47	60	46	60	45	54	55	63	62	53	53
Organic subset	12	11	9	17	10	17	11	17	11	11	12	12	17	17	13
Metals subset	9	10	12	13	12	15	13	15	12	15	14	16	17	17	14
Bioassessment															
Overall	67%	78%	80%	82%	78%	91%	77%	91%	75%	90%	90%	92%	95%	94%	84%
Organic subset	100%	92%	75%	94%	83%	94%	92%	94%	92%	92%	100%	100%	94%	94%	93%
Metals subset	50%	56%	67%	72%	67%	83%	72%	83%	67%	83%	78%	89%	94%	94%	75%

* not calculated if density is < 550

not sampled in 1992

**C-8. Mean metric values and bioassessment scores for Clark Fork River below Warm Springs Creek:
Station 07 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	25	24	25	23	22	24	25	36	37	35	43	44	47	48	47	34
Shannon diversity	2.9	2.7	1.5	2.5	2.3	2.4	2.6	3.6	3.2	3.6	2.9	4.0	3.0	4.2	3.7	3.0
EPT/EPTC	0.97	0.95	0.98	0.93	0.91	0.94	0.94	0.61	0.85	0.64	0.83	0.60	0.86	0.63	0.61	0.82
Hydropsychinae/Trichopte	1.00	0.90	0.96	0.98	0.99	0.99	0.96	0.95	0.89	0.72	0.95	0.74	0.87	0.55	0.79	0.88
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	0.99	0.86	1.00	0.46	0.90	0.80	0.84	0.26	0.45	0.15	0.65	0.76
Biotic index	4.7	4.7	4.1	4.7	5.0	4.8	4.9	5.2	4.5	5.0	4.9	4.6	4.6	4.6	4.8	4.7
% Filterer	65	64	81	58	75	62	54	25	41	27	57	27	62	16	30	50
Density	847	959	2874	1151	2402	1397	1353	852	2894	2152	2783	940	2439	1493	2269	1787
EPT richness	10	10	11	10	11	11	12	15	15	16	20	22	22	21	21	15
Metals Tolerance index	5.0	5.0	4.9	5.0	5.2	5.3	5.0	4.6	4.6	5.6	5.1	5.4	4.8	4.9	4.6	5.0
Metric scores																
Taxa richness	3	2	3	2	2	2	2	3	5	5	5	5	6	6	6	4
Shannon diversity	4	4	1	3	3	3	4	6	6	5	6	4	6	5	6	4
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichopte	0	4	2	1	1	1	2	2	4	6	6	2	6	5	6	3
Baetidae/Ephemeroptera	0	0	0	0	1	5	0	6	4	6	6	6	6	6	6	3
Biotic index	4	4	5	4	4	4	4	3	5	5	4	4	4	4	4	4
% Filterer	3	3	0	4	1	3	3	5	6	6	6	6	6	3	6	4
Density (high)	6	6	4	6	5	6	6	6	6	4	5	4	6	5	6	5
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
EPT richness	3	3	3	3	3	3	3	4	4	4	4	5	6	5	5	4
Metals Tolerance index	4	4	5	4	4	4	4	5	5	5	4	4	4	5	5	4
Total	39	42	35	39	36	43	43	55	54	58	51	62	57	62	61	49
Organic subset	13	13	9	14	10	13	15	15	15	15	12	16	12	16	15	14
Metals subset	13	13	14	13	13	13	13	15	15	15	14	15	16	17	16	14
Bioassessment																
Overall	59%	64%	53%	59%	55%	65%	65%	65%	83%	82%	88%	77%	94%	86%	94%	92%
Organic subset	72%	72%	50%	78%	56%	72%	83%	83%	83%	83%	67%	89%	67%	89%	83%	75%
Metals subset	72%	72%	78%	72%	72%	72%	83%	83%	83%	83%	83%	83%	83%	89%	89%	80%

**C-9. Mean metric values and bioassessment scores for Clark Fork River at Dempsey:
Station 08 - August, 1986-1992 and 1998-2000 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1998	1999	2000	Mean
Metric values											
Taxa richness	22	21	28	20	26	23	33	37	35	38	28
Shannon diversity	2.7	2.8	2.3	2.1	3.7	3.1	3.2	3.3	3.7	3.4	3.0
EPT/EPTC	0.99	0.84	0.82	0.90	0.86	0.84	0.94	0.76	0.77	0.92	0.86
Hydropsychinae/Trichop	0.98	0.95	0.95	0.96	0.83	0.93	0.65	0.80	0.87	0.79	0.87
Baetidae/Ephemeropter	0.79	0.94	0.40	0.37	0.70	0.23	0.81	0.75	0.20	0.89	0.61
Biotic index	4.6	5.1	4.6	5.0	4.8	4.7	5.1	5.1	4.8	4.6	4.8
% Filterer	59	57	56	68	36	27	37	52	43	42	48
Density	589	924	1981	1518	1335	460	1376	2624	1975	1101	1388
EPT richness	10	10	12	9	12	13	17	19	18	20	14
Metals Tolerance index	4.9	5.7	5.2	4.8	5.1	5.1	4.8	5.2	4.7	4.7	5.0
Metric scores											
Taxa richness	2	2	3	2	3	2	4	5	5	5	3
Shannon diversity	4	4	3	2	6	5	5	6	6	6	5
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichop	1	2	2	2	6	3	6	6	5	6	4
Baetidae/Ephemeropter	6	2	6	6	6	6	6	6	6	4	5
Biotic index	4	4	4	4	4	4	4	4	4	4	4
% Filterer	4	4	4	2	6	6	*	6	5	6	5
Density (high)	6	6	6	6	6	6	6	4	6	6	6
Density (low)	6	6	6	6	6	5	6	6	6	6	6
EPT richness	3	3	3	2	3	3	4	5	5	5	4
Metals Tolerance index	5	4	4	5	4	4	5	4	5	5	5
Total	47	43	47	43	56	44	58	56	60	59	52
Organic subset	14	14	14	12	16	10	16	13	16	16	15
Metals subset	14	13	13	13	13	12	15	15	16	16	14
Bioassessment											
Overall	71%	65%	71%	65%	85%	73%	88%	85%	91%	89%	79%
Organic subset	78%	78%	78%	67%	89%	83%	89%	72%	89%	89%	82%
Metals subset	78%	72%	72%	72%	72%	67%	83%	83%	89%	89%	78%

* not calculated if density is < 550.

**C-10. Mean metric values and bioassessment scores for Clark Fork River at Sager Lane:
Station 08.5 - August, 1990-1992 and 1998-2000 (4 Hess samples per year).**

	1990	1991	1992	1998	1999	2000	Mean
Metric values							
Taxa richness	26	28	35	36	38	43	34
Shannon diversity	3.6	3.6	3.5	3.5	3.7	3.5	3.6
EPT/EPTC	0.74	0.80	0.70	0.84	0.70	0.92	0.78
Hydropsychinae/Trichoptera	0.78	0.60	0.35	0.72	0.73	0.65	0.64
Baetidae/Ephemeroptera	0.56	0.43	0.34	0.84	0.17	0.74	0.51
Biotic index	4.8	4.6	5.2	4.9	5.0	5.0	4.9
% Filterer	22	18	9	44	32	45	28
Density	1282	840	1155	1372	2380	2956	1664
EPT richness	14	15	17	19	16	21	17
Metals Tolerance index	4.9	4.7	4.8	5.0	4.7	4.6	4.8
Metric scores							
Taxa richness	3	3	5	5	5	6	5
Shannon diversity	6	6	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	6	6
Biotic index	4	4	3	4	4	4	4
% Filterer	6	6	6	6	6	6	6
Density (high)	6	6	6	6	5	4	6
Density (low)	6	6	6	6	6	6	6
EPT richness	4	4	4	5	4	5	4
Metals Tolerance index	5	5	5	4	5	5	5
Total	58	58	59	60	59	60	59
Organic subset	16	16	15	16	15	14	15
Metals subset	15	15	15	15	15	16	15
Bioassessment							
Overall	88%	88%	89%	91%	89%	91%	89%
Organic subset	89%	89%	83%	89%	83%	78%	85%
Metals subset	83%	83%	83%	83%	83%	89%	84%

**C-11. Mean metric values and bioassessment scores for Clark Fork River at Deer Lodge:
Station 09 - August, 1986-1999 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	24	28	26	32	26	28	29	26	26	31	27	30	36	40	29	2.5
Shannon diversity	1.7	2.3	2.3	2.1	2.9	2.3	3.9	2.2	2.7	2.4	2.4	1.9	2.8	3.3	2.3	0.87
EPT/EPTC	0.98	0.94	0.77	0.87	0.94	0.91	0.94	0.81	0.95	0.71	0.89	0.87	0.91	0.75	0.83	0.94
Hydropsychinae/Trichoptera	1.00	0.95	0.99	0.93	0.96	0.70	0.99	0.73	0.99	0.96	0.98	0.98	0.99	0.96	0.92	0.83
Baetidae/Ephemeroptera	0.99	0.93	0.63	0.42	0.78	0.71	0.98	0.68	1.00	0.97	0.99	0.96	0.99	0.69	0.72	0.72
Biotic index	4.8	4.9	4.6	5.0	5.0	4.8	5.0	4.9	4.8	5.5	5.1	4.9	5.1	5.4	4.9	5.0
% Filterer	77	69	66	67	77	52	78	42	76	71	76	69	81	61	55	68
Density	1410	1555	3745	2150	3183	909	2283	569	2288	2135	3308	459	2825	3918	3856	2306
EPT richness	10	14	11	15	13	15	12	13	11	12	16	13	15	15	19	14
Metals Tolerance index	4.9	5.1	5.5	4.9	5.0	4.7	5.3	4.8	5.1	5.8	5.3	5.2	5.4	5.0	5.2	5.2
Metric scores																
Taxa richness	2	3	3	4	3	3	3	3	3	3	3	4	3	4	5	3
Shannon diversity	1	3	3	3	2	4	3	6	3	4	3	3	2	4	5	3
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	0	2	1	3	2	6	1	6	1	2	1	1	2	3	2	2
Baetidae/Ephemeroptera	1	3	6	6	6	1	6	0	1	1	1	2	1	6	6	3
Biotic index	4	4	4	4	4	4	4	4	3	4	4	4	4	3	4	4
% Filterer	0	2	2	2	0	5	0	6	0	1	0	2	0	3	5	2
Density (high)	6	6	3	5	4	6	5	6	5	5	3	*	4	2	2	4
Density (low)	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6
EPT richness	3	4	3	4	3	4	3	3	3	3	3	4	3	4	5	4
Metals Tolerance index	5	4	4	5	4	5	4	5	4	4	4	4	4	4	4	4
Total	34	43	41	48	40	55	36	57	35	38	36	33	36	45	52	42
Organic subset	10	12	9	11	8	15	9	16	9	9	7	6	8	8	11	10
Metals subset	14	14	13	15	13	15	13	14	13	14	12	14	14	15	14	14
Bioassessment																
Overall	52%	65%	62%	73%	61%	83%	55%	86%	53%	58%	55%	55%	55%	68%	79%	64%
Organic subset	56%	67%	50%	61%	44%	83%	50%	89%	50%	50%	39%	50%	44%	44%	61%	56%
Metals subset	78%	78%	72%	83%	72%	83%	72%	78%	72%	78%	67%	78%	78%	83%	83%	76%

* not calculated if density is < 550

**C-12. Mean metric values and bioassessment scores for Clark Fork River above Little Blackfoot River:
Station 10 - August, 1986-2000 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	23	26	28	20	25	26	30	30	27	34	32	18	30	33	39	28
Shannon diversity	2.1	2.4	2.4	3.4	3.0	3.3	2.9	4.0	2.8	3.1	2.9	2.6	2.4	3.2	3.4	2.9
EPT/EPTC	0.92	0.91	0.62	0.83	0.77	0.91	0.92	0.81	0.91	0.65	0.91	0.83	0.92	0.83	0.80	0.84
Hydropsychinae/Trichoptera	0.99	0.94	0.81	0.53	0.73	0.44	0.95	0.60	0.93	0.94	0.93	0.92	0.94	0.87	0.93	0.83
Baetidae/Ephemeroptera	0.93	0.81	0.79	0.51	0.72	0.10	0.92	0.48	1.00	0.37	0.96	1.00	1.00	0.51	0.31	0.69
Biotic index	5.2	4.9	5.4	5.0	5.7	4.9	4.9	4.9	4.8	5.4	4.9	4.8	5.0	5.2	5.0	5.1
% Filterer	78	73	73	32	65	26	66	28	76	55	77	65	80	63	64	61
Density	3131	974	1688	448	1889	1615	1116	528	2388	3006	2045	195	1537	2580	2041	1679
EPT richness	11	14	12	11	14	15	15	15	16	16	20	9	15	16	19	14
Metals Tolerance index	5.3	5.1	5.4	4.9	5.5	4.7	5.2	4.8	5.0	5.5	5.1	5.2	5.2	4.8	5.1	
Metric scores																
Taxa richness	2	3	3	2	3	4	4	4	3	4	4	1	4	4	5	3
Shannon diversity	2	3	3	6	5	4	6	4	5	4	4	3	5	6	4	
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	1	2	6	6	6	6	2	6	3	2	3	3	2	5	3	4
Baetidae/Ephemeroptera	3	6	6	6	6	6	3	6	0	6	2	0	0	6	6	4
Biotic index	3	4	3	4	3	4	4	4	4	3	4	4	4	3	4	4
% Filterer	0	1	1	6	*	6	6	2	6	0	5	0	3	0	3	3
Density (high)	4	6	6	*	6	6	6	*	5	4	5	*	6	5	5	5
Density (low)	6	6	6	4	6	6	6	5	6	6	6	2	6	6	6	6
EPT richness	3	4	3	3	4	4	4	4	4	4	5	2	4	4	5	4
Metals Tolerance index	4	4	4	5	4	5	4	5	4	4	4	4	4	4	5	4
Total	34	45	47	48	52	57	45	52	39	49	43	29	39	51	54	47
Organic subset	7	11	10	10	12	16	12	10	9	12	9	7	10	11	12	12
Metals subset	13	14	13	12	14	15	14	14	14	14	15	8	14	14	16	14
Bioassessment																
Overall	52%	68%	71%	80%	79%	86%	68%	87%	59%	74%	65%	48%	59%	77%	82%	70%
Organic subset	39%	61%	56%	83%	67%	89%	67%	83%	50%	67%	50%	58%	61%	67%	64%	
Metals subset	72%	78%	72%	67%	78%	83%	78%	78%	83%	44%	78%	78%	89%	89%	76%	

* not calculated if density is < 550

**C-13. Mean metric values and bioassessment scores for Little Blackfoot River:
Station 10.2 - August, 1993-2000 (4 Hess samples per year).**

	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values									
Taxa richness	4.0	4.2	4.1	3.9	3.3	3.6	4.3	4.6	4.0
Shannon diversity	3.9	4.2	4.2	3.9	4.2	4.1	4.4	4.0	4.1
EPT/EPTC	0.32	0.58	0.55	0.61	0.55	0.51	0.38	0.65	0.52
Hydropsychinae/Trichoptera	0.14	0.62	0.38	0.71	0.52	0.70	0.42	0.71	0.53
Baetidae/Ephemeroptera	0.30	0.88	0.57	0.48	0.60	0.56	0.53	0.88	0.60
Biotic index	4.3	4.1	4.4	4.0	4.1	4.3	4.2	4.4	4.2
% Filterer	10	40	31	53	42	42	28	34	35
Density	460	1413	906	799	274	350	678	1427	788
EPT richness	20	22	22	20	18	19	22	24	21
Metals Tolerance index	3.3	4.4	4.4	4.3	3.8	4.0	3.4	4.2	4.0
Metric scores									
Taxa richness	6	6	6	5	4	5	6	6	6
Shannon diversity	6	6	6	6	6	6	6	6	6
EPT/EPTC	3	6	6	6	6	5	4	6	5
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	6	4	6	6	6	6	6	4	6
Biotic index	5	5	5	5	5	5	5	5	5
% Filterer	6	6	6	5	6	6	6	6	6
Density (high)	*	6	6	6	*	*	6	6	6
Density (low)	5	6	6	6	3	4	6	6	5
EPT richness	5	6	6	5	5	5	6	6	6
Metals Tolerance index	6	5	5	6	5	6	5	5	5
Total	54	62	64	61	53	53	63	62	59
Organic subset	11	17	17	16	11	11	17	17	15
Metals subset	16	17	17	16	14	14	18	17	16
Bioassessment									
Overall	90%	94%	97%	92%	88%	88%	95%	94%	92%
Organic subset	92%	94%	94%	89%	92%	92%	94%	94%	93%
Metals subset	89%	94%	94%	89%	78%	78%	100%	94%	90%

* not calculated if density is < 550

**C-14. Mean metric values and bioassessment scores for Clark Fork River at Gold Creek Bridge:
Station 11 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	29	30	35	32	25	34	37	39	39	37	32	24	37	35	44	34
Shannon diversity	3.3	2.9	3.8	2.9	3.2	3.6	3.4	4.3	3.6	3.6	3.5	3.0	3.4	3.1	4.2	3.4
EPT/EPTC	0.87	0.83	0.80	0.93	0.93	0.86	0.63	0.79	0.75	0.73	0.86	0.92	0.86	0.79	0.73	0.82
Hydropsychinae/Trichoptera	0.76	0.79	0.93	0.23	0.90	0.56	0.54	0.58	0.83	0.90	0.82	0.86	0.87	0.71	0.75	0.74
Baetidae/Ephemeroptera	0.51	0.49	0.40	0.20	0.92	0.18	0.24	0.37	0.84	0.60	0.95	0.96	0.87	0.40	0.61	0.57
Biotic index	4.8	5.1	4.2	4.9	5.2	5.0	5.9	4.8	4.5	5.0	4.4	4.3	4.8	5.1	4.7	4.9
% Filterer	4.2	6.3	4.1	2.3	6.8	3.4	4.7	3.1	5.4	5.3	6.2	7.6	5.6	5.1	3.5	4.9
Density	838	1073	396	965	457	1446	1781	558	1265	906	509	398	909	1390	1426	954
EPT richness	15	17	18	18	13	19	17	21	24	19	19	13	20	18	22	18
Metals Tolerance index	4.8	5.3	4.4	4.6	5.5	5.1	5.5	4.6	4.5	5.0	4.5	4.6	4.9	5.0	4.3	4.8
Metric scores																
Taxa richness	3	4	5	4	3	4	4	3	4	5	5	5	4	2	5	4
Shannon diversity	5	4	6	4	5	6	6	6	6	6	6	6	6	5	6	5
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	6	3	6	4	6	6	6	6	4	6	5	5	6	6	5
Baetidae/Ephemeroptera	6	6	6	6	3	6	6	6	6	6	6	2	5	6	6	5
Biotic index	4	4	5	4	3	4	2	6	6	5	5	4	5	4	4	4
% Filterer	6	3	6	*	6	*	6	6	6	6	6	*	0	4	5	5
Density (high)	6	6	4	6	5	6	6	6	6	6	6	*	6	6	6	6
Density (low)	6	6	4	5	5	3	5	4	5	6	5	4	6	6	6	6
EPT richness	4	4	5	5	4	4	4	4	5	6	5	3	5	5	6	5
Metals Tolerance index	5	4	5	5	4	4	4	5	5	5	4	5	5	4	5	5
Bioassessment																
Total	57	53	51	58	38	59	56	62	62	57	47	37	57	58	63	54
Organic subset	16	13	11	16	5	16	14	17	16	15	8	5	14	15	16	13
Metals subset	15	14	14	16	12	15	14	16	17	15	15	12	16	15	17	15
Overall	86%	80%	85%	88%	63%	89%	85%	94%	94%	94%	86%	78%	62%	86%	88%	95%
Organic subset	89%	72%	92%	89%	42%	89%	78%	94%	89%	83%	67%	42%	78%	83%	89%	78%
Metals subset	83%	78%	78%	89%	67%	83%	78%	94%	94%	83%	67%	83%	67%	83%	94%	83%

* not calculated if density is < 550

84%
78%
83%

**C-15. Mean metric values and bioassessment scores for Flint Creek at New Chicago:
Station 11.5 - August, 1993-2000 (four Hess samples per year).**

	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values									
Taxa richness	30	34	35	39	33	36	33	35	34
Shannon diversity	1.7	3.1	3.8	3.3	3.4	3.1	3.8	3.0	3.1
EPT/EPTC	0.92	0.88	0.71	0.87	0.89	0.74	0.73	0.77	0.81
Hydropsychinae/Trichoptera	0.05	0.71	0.50	0.86	0.60	0.26	0.68	0.30	0.50
Baetidae/Ephemeroptera	0.38	0.86	0.69	0.81	0.74	0.54	0.46	0.70	0.65
Biotic index	3.1	4.3	4.2	4.5	3.7	3.9	4.7	3.8	4.0
% Filterer	78	68	52	74	70	57	43	54	62
Density	1137	1665	1501	1731	827	964	393	1273	1186
EPT richness	14	18	19	22	19	21	17	19	19
Metals Tolerance index	3.1	4.8	4.5	4.5	4.1	4.6	5.0	4.0	4.3
Metric scores									
Taxa richness	4	4	5	5	4	5	4	5	5
Shannon diversity	1	5	6	5	6	5	6	5	5
EPT/EPTC	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	6	6	5	6	6	6	6	6
Baetidae/Ephemeroptera	6	5	6	6	6	6	6	6	6
Biotic index	6	5	5	5	6	6	4	6	5
% Filterer	0	2	5	1	2	4	6	5	3
Density (high)	6	6	6	6	6	6	*	6	6
Density (low)	6	6	6	6	6	6	4	6	6
EPT richness	4	5	5	6	5	5	4	5	5
Metals Tolerance index	6	5	5	5	5	5	4	5	5
Total	51	55	61	56	58	60	50	61	57
Organic subset	12	13	16	12	14	16	10	17	14
Metals subset	16	16	16	17	16	16	12	16	16
Bioassessment									
Overall	77%	83%	92%	85%	88%	91%	83%	92%	87%
Organic subset	67%	72%	89%	67%	78%	89%	83%	94%	80%
Metals subset	89%	89%	89%	94%	89%	89%	67%	89%	87%

* not calculated if density is < 550

**C-16. Mean metric values and bioassessment scores for Clark Fork River at Bearmouth:
Station 11.7 - August, 1993-2000 (4 Hess samples per year).**

	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values									
Taxa richness	4.4	3.9	3.5	3.1	2.3	3.4	4.2	41.3	3.6
Shannon diversity	3.7	2.9	2.6	2.9	2.6	3.1	4.0	2.7	3.1
EPT/EPTC	0.74	0.72	0.87	0.86	0.90	0.85	0.71	0.96	0.83
Hydropsychinae/Trichoptera	0.51	0.98	0.97	0.92	0.94	0.81	0.58	0.88	0.82
Baetidae/Ephemeroptera	0.18	0.92	0.74	0.96	0.97	0.90	0.60	0.80	0.76
Biotic index	5.1	5.2	5.0	4.8	4.7	4.9	4.8	4.9	4.9
% Filterer	1.4	6.1	7.4	6.9	7.3	5.2	3.4	7.5	5.7
Density	1808	3675	1809	1690	486	1043	2352	2771	1954
EPT richness	20	22	19	17	13	19	22	22	19
Metals Tolerance index	4.7	5.0	5.0	4.9	4.9	4.2	4.6	4.8	
Metric scores									
Taxa richness	6	5	5	4	2	4	6	6	5
Shannon diversity	6	4	4	4	4	5	6	4	5
EPT/EPTC	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	1	1	3	2	6	6	4	4
Baetidae/Ephemeroptera	6	3	6	2	1	4	6	6	4
Biotic index	4	3	4	4	4	4	4	4	4
% Filterer	6	3	1	2	1	5	6	1	3
Density (high)	6	3	6	6	*	6	5	4	5
Density (low)	6	6	6	6	5	6	6	6	6
EPT richness	5	6	5	4	3	5	6	6	5
Metals Tolerance index	5	4	4	5	5	5	5	5	5
Total	62	44	48	46	33	56	62	52	51
Organic subset	16	9	11	12	5	15	15	9	12
Metals subset	16	16	15	15	13	16	17	17	16
Bioassessment									
Overall	94%	67%	73%	70%	55%	85%	94%	79%	77%
Organic subset	89%	50%	61%	67%	42%	83%	83%	50%	66%
Metals subset	89%	89%	83%	83%	72%	89%	94%	94%	87%

* not calculated if <550

**C-17. Mean metric values and bioassessment scores for Clark Fork River at Bonita:
Station 12 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	26	34	31	29	23	37	34	30	34	31	24	32	43	36	32	3.2
Shannon diversity	2.2	3.1	2.4	3.0	2.3	2.2	2.5	3.4	2.9	2.8	2.8	2.8	2.7	3.6	2.3	2.7
EPT/EPTC	0.95	0.64	0.76	0.83	0.91	0.91	0.85	0.84	0.80	0.87	0.82	0.91	0.91	0.95	0.95	0.86
Hydropsychinae/Trichopter	0.97	0.96	0.99	0.83	0.95	0.95	0.98	0.73	0.93	0.95	0.94	0.96	0.90	0.72	0.96	0.91
Baetidae/Ephemeroptera	0.94	0.48	0.90	0.88	0.92	0.91	0.98	0.17	0.87	0.69	0.96	0.96	0.91	0.38	0.57	0.77
Biotic index	4.7	5.1	4.7	5.2	5.0	5.0	5.2	4.7	4.8	4.8	4.9	4.5	4.7	4.4	4.9	4.8
% Filterer	63	52	69	60	72	74	67	33	64	68	65	67	64	43	80	63
Density	949	1228	8080	2227	1245	3153	3559	701	1926	1127	1338	293	763	1578	3482	2110
EPT richness	13	16	15	15	13	17	15	17	16	17	16	13	19	25	19	16
Metals Tolerance index	4.7	4.9	5.0	5.1	5.1	5.2	5.1	4.5	4.9	4.8	4.9	4.6	4.8	4.2	4.7	4.8
Metric scores																
Taxa richness	3	4	4	3	2	5	4	4	4	4	4	4	4	2	4	4
Shannon diversity	3	5	3	5	3	3	3	6	4	4	4	4	4	4	6	4
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichopter	1	2	1	6	2	2	1	6	3	2	2	2	2	4	6	3
Baetidae/Ephemeroptera	2	6	4	4	3	3	1	6	5	6	2	2	2	3	6	4
Biotic index	4	4	3	4	4	3	4	3	4	4	4	4	5	4	5	4
% Filterer	3	5	2	4	1	1	2	6	3	2	3	2	3	6	0	3
Density (high)	6	6	0	5	6	4	3	6	6	6	6	6	6	6	3	5
Density (low)	6	6	.6	6	6	6	6	6	6	6	6	6	6	6	6	6
EPT richness	3	4	4	4	3	4	4	4	4	4	4	4	3	5	6	4
Metals Tolerance index	5	5	4	4	4	4	4	5	5	5	5	5	5	5	5	5
Total	42	53	38	50	40	42	37	59	50	49	46	34	50	64	45	47
Organic subset	13	15	6	12	11	9	8	16	13	12	13	7	13	17	7	11
Metals subset	14	15	14	14	13	14	14	15	15	15	15	11	16	17	16	15
Bioassessment																
Overall	64%	80%	58%	76%	61%	64%	56%	89%	76%	74%	70%	57%	76%	97%	68%	71%
Organic subset	72%	83%	33%	67%	61%	50%	44%	89%	72%	67%	72%	58%	72%	94%	39%	64%
Metals subset	78%	83%	78%	78%	72%	78%	83%	83%	83%	83%	83%	61%	89%	94%	89%	81%

* not calculated if <550

**C-18. Mean metric values and bioassessment scores for Rock Creek near Clinton:
Station 12.5 - August, 1993-2000 (4 Hess samples per year).**

	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values									
Taxa richness	3.6	3.5	3.7	3.6	3.3	4.0	4.0	4.1	3.7
Shannon diversity	3.0	3.8	4.0	4.0	4.1	4.2	4.3	3.8	3.9
EPT/EPTC	0.28	0.48	0.60	0.63	0.73	0.61	0.39	0.44	0.52
Hydropsychinae/Trichoptera	0.18	0.54	0.27	0.35	0.37	0.28	0.27	0.50	0.35
Baetidae/Ephemeroptera	0.26	0.26	0.34	0.34	0.43	0.23	0.38	0.31	0.32
Biotic index	3.8	3.6	3.6	3.6	3.3	3.4	4.5	3.8	3.7
% Filterer	1.0	1.7	2.0	2.9	2.3	2.5	1.3	1.9	2.0
Density	7.24	5.04	3.75	5.14	2.51	5.78	4.76	4.32	4.82
EPT richness	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.1
Metals Tolerance index	2.4	2.7	3.0	3.1	2.9	3.5	4.3	2.8	3.1
Metric scores									
Taxa richness	5	5	5	5	4	6	6	6	5
Shannon diversity	5	6	6	6	6	6	6	6	6
EPT/EPTC	3	5	6	6	6	6	4	4	5
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6
Biotic index	6	6	6	6	6	6	5	6	6
% Filterer	6	*	*	*	*	6	6	6	6
Density (high)	6	5	4	5	3	6	5	4	6
Density (low)	5	5	5	5	5	5	6	6	5
EPT richness	6	6	6	6	6	6	5	6	6
Metals Tolerance index	6	56	56	57	54	65	55	56	57
Total	60	56	56	57	54	65	55	56	57
Organic subset	18	12	12	12	12	18	11	12	13
Metals subset	17	16	15	16	14	17	16	16	16
Bioassessment									
Overall	91%	93%	93%	95%	90%	98%	92%	93%	93%
Organic subset	100%	100%	100%	100%	100%	100%	92%	100%	99%
Metals subset	94%	89%	83%	89%	78%	94%	89%	89%	88%

* not calculated if density is < 550

**C-19. Mean metric values and bioassessment scores for Clark Fork River at Turah:
Station 13 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	3.4	3.5	4.2	3.1	3.1	5.0	4.9	4.6	3.8	4.4	4.0	26	37	42	41	3.9
Shannon diversity	3.7	3.3	3.1	3.7	3.6	4.1	3.5	4.4	3.5	4.0	3.9	3.5	3.5	4.2	3.7	3.7
EPT/EPTC	0.63	0.81	0.80	0.77	0.61	0.63	0.72	0.76	0.73	0.68	0.80	0.92	0.89	0.66	0.79	0.75
Hydropsychinae/Trichoptera	0.81	0.92	0.96	0.85	0.54	0.75	0.93	0.85	0.89	0.70	0.81	0.80	0.88	0.59	0.84	0.81
Baetidae/Ephemeroptera	0.40	0.68	0.83	0.48	0.22	0.40	0.87	0.34	0.59	0.53	0.55	0.50	0.51	0.22	0.25	0.49
Biotic index	4.8	4.7	4.4	4.7	5.1	5.0	4.8	4.0	4.3	4.9	4.3	3.8	4.2	4.2	4.2	4.5
% Filterer	44	68	65	50	27	34	56	22	51	44	57	54	54	25	57	47
Density	1539	1708	5636	1725	2145	2164	2757	483	1078	1941	1354	226	674	1111	1454	1733
EPT richness	17	19	23	17	16	26	26	26	20	25	23	23	17	22	25	22
Metals Tolerance index	5.0	4.8	4.8	4.6	5.3	5.1	4.7	3.5	4.2	5.2	4.2	4.0	4.3	3.9	4.2	4.5
Metric scores																
Taxa richness	4	5	6	4	4	6	6	6	5	6	6	6	3	5	6	5
Shannon diversity	6	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	3	2	5	6	6	3	5	4	6	6	6	4	6	6	5
Baetidae/Ephemeroptera	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6
Biotic index	4	4	5	4	4	4	4	4	5	5	4	5	6	5	5	5
% Filterer	6	2	3	6	6	5	4	4	6	5	6	4	5	6	4	5
Density (high)	6	6	0	6	6	6	6	6	*	6	6	6	*	6	6	5
Density (low)	6	6	6	6	6	6	6	5	6	6	6	2	6	6	6	6
EPT richness	4	5	6	4	4	6	6	6	5	6	6	4	6	6	6	5
Metals Tolerance index	4	5	5	4	4	5	6	5	4	5	5	5	5	6	5	5
Total	58	53	50	58	57	61	55	57	59	62	62	49	60	65	62	58
Organic subset	16	12	8	16	15	15	12	11	16	16	15	11	16	17	15	14
Metals subset	14	16	17	15	14	16	17	17	16	16	17	11	17	18	17	16
Bioassessment																
Overall	88%	80%	76%	88%	86%	92%	83%	95%	89%	94%	94%	82%	91%	98%	94%	89%
Organic subset	89%	67%	44%	89%	83%	83%	67%	92%	89%	89%	89%	92%	89%	94%	83%	82%
Metals subset	78%	89%	94%	83%	78%	89%	94%	94%	89%	94%	94%	61%	90%	94%	100%	88%

* not calculated if <550

**C-20. Mean metric values and bioassessment scores for Blackfoot River at USGS:
Station 14 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	21	31	36	28	31	30	41	37	39	42	35	32	36	35	41	34
Shannon diversity	4.0	3.3	4.0	4.0	4.1	4.1	2.8	3.9	4.0	3.6	3.9	3.6	3.9	4.2	3.0	3.8
EPT/EPTC	0.76	0.37	0.59	0.77	0.88	0.88	0.20	0.50	0.68	0.54	0.91	0.95	0.79	0.68	0.34	0.66
Hydropsychinae/Trichoptera	0.62	0.84	0.73	0.79	0.74	0.65	0.77	0.64	0.78	0.64	0.74	0.80	0.75	0.46	0.57	0.70
Baetidae/Ephemeroptera	0.49	0.49	0.71	0.37	0.28	0.47	0.50	0.41	0.44	0.35	0.75	0.67	0.32	0.29	0.22	0.45
Biotic index	3.4	4.8	4.8	3.7	3.5	3.6	4.4	4.1	4.0	3.7	3.7	3.9	3.9	3.5	4.0	3.9
% Filterer	19	17	32	42	45	30	7	19	37	26	55	66	51	30	16	33
Density	65	414	382	192	408	170	975	284	511	535	426	291	531	268	721	412
EPT richness	14	18	20	17	20	20	23	22	22	24	21	19	24	21	24	20
Metals Tolerance index	3.0	2.9	3.8	3.4	3.6	3.7	2.9	3.7	3.7	2.6	3.8	3.9	3.4	3.1	2.5	3.3
Metric scores																
Taxa richness	2	4	5	3	4	4	6	5	5	6	6	6	6	5	5	5
Shannon diversity	6	5	6	6	6	6	4	6	6	6	6	6	6	5	6	6
EPT/EPTC	6	4	6	6	6	6	2	5	6	5	6	6	6	6	6	5
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	6	4	4	6	6	6	5	5	5	6	6	6	6	5	5	5
% Filterer	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Density (high)	*	*	*	*	*	*	6	*	*	*	*	*	*	*	*	6
Density (low)	1	4	4	2	4	2	6	3	5	5	4	3	5	3	6	4
EPT richness	4	5	5	4	5	5	6	6	6	6	5	5	6	5	6	5
Metals Tolerance index	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total	49	50	54	51	55	53	59	54	57	58	55	50	57	55	61	55
Organic subset	12	10	10	12	12	12	17	11	11	12	11	8	11	12	17	12
Metals subset	11	15	15	12	15	13	18	15	17	17	15	14	17	14	18	15
Bioassessment																
Overall	82%	83%	90%	85%	92%	88%	89%	90%	95%	97%	92%	83%	95%	92%	92%	90%
Organic subset	100%	83%	83%	100%	100%	100%	94%	94%	92%	92%	100%	92%	67%	92%	100%	93%
Metals subset	61%	83%	83%	67%	83%	72%	100%	83%	94%	94%	94%	83%	78%	94%	78%	100%

* not calculated if density is < 550

**C-21. Mean metric values and bioassessment scores for Clark Fork River above Missoula:
Station 15.5 - August, 1989-2000 (4 Hess samples per year).**

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values													
Taxa richness	29	25	32	39	36	37	47	38	29	36	36	43	36
Shannon diversity	3.4	2.8	3.2	3.7	4.0	3.5	3.5	3.6	2.9	3.1	4.2	3.9	3.5
EPT/EPTC	0.84	0.91	0.83	0.65	0.85	0.76	0.88	0.92	0.95	0.92	0.84	0.54	0.82
Hydropsychinae/Trichoptera	0.86	0.92	0.94	0.89	0.90	0.97	0.95	0.93	0.95	0.91	0.56	0.88	0.89
Baetidae/Ephemeroptera	0.71	0.51	0.82	0.96	0.30	0.66	0.40	0.57	0.44	0.65	0.28	0.55	0.57
Biotic index	4.3	4.1	4.5	5.0	3.8	4.6	4.3	4.3	4.3	4.3	3.8	4.9	4.4
% Filterer	67	79	64	53	48	58	67	66	79	75	49	38	62
Density	341	468	560	1841	384	1292	2090	795	631	1257	411	1646	976
EPT richness	18	16	16	21	21	20	27	23	17	22	22	22	20
Metals Tolerance index	4.3	4.0	4.6	5.2	3.4	4.7	4.3	4.3	4.4	4.4	3.8	4.4	4.3
Metric scores													
Taxa richness	3	3	4	5	5	5	6	5	3	5	5	6	5
Shannon diversity	6	4	5	6	6	6	6	6	4	5	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	5	6
Hydropsychinae/Trichoptera	5	3	2	4	4	1	2	3	2	3	6	4	3
Baetidae/Ephemeroptera	6	6	6	2	6	6	6	6	6	6	6	6	6
Biotic index	5	5	5	4	6	4	5	5	5	5	6	4	5
% Filterer	2	0	3	5	6	4	2	2	0	1	6	6	3
Density (high)	*	6	6	*	6	5	6	6	6	*	6	6	6
Density (low)	3	5	6	6	4	6	6	6	6	4	6	5	5
EPT richness	5	4	4	5	5	6	6	6	4	6	6	6	5
Metals Tolerance index	5	5	5	4	6	5	5	5	5	5	6	5	5
Total	46	41	52	53	54	54	55	56	47	54	57	60	54
Organic subset	7	5	14	15	12	14	12	13	11	12	12	16	14
Metals subset	13	14	15	15	15	16	17	17	15	17	16	17	16
Bioassessment													
Overall	77%	68%	79%	80%	90%	82%	83%	85%	71%	82%	95%	91%	82%
Organic subset	58%	42%	78%	83%	100%	78%	67%	72%	61%	67%	100%	89%	75%
Metals subset	72%	78%	83%	83%	83%	94%	94%	94%	94%	94%	89%	94%	87%

* not calculated if density is < 550

**C-22. Mean metric values and bioassessment scores for Clark Fork River at Shuffield's:
Station 18 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	29	38	34	27	30	34	38	45	39	42	39	32	39	42	43	37
Shannon diversity	2.9	4.0	3.2	3.5	3.5	3.6	2.9	4.0	3.1	3.8	3.6	3.4	2.7	3.7	3.4	3.4
EPT/EPTC	0.90	0.79	0.90	0.82	0.86	0.75	0.91	0.70	0.84	0.60	0.90	0.86	0.31	0.77	0.83	0.78
Hydropsychinae/Trichoptera	0.96	0.75	0.71	0.92	0.73	0.81	0.83	0.73	0.92	0.81	0.85	0.86	0.75	0.37	0.86	0.79
Baetidae/Ephemeroptera	0.80	0.93	0.72	0.50	0.67	0.53	0.67	0.59	0.60	0.77	0.66	0.30	0.40	0.40	0.56	0.61
Biotic index	4.3	4.8	4.1	4.5	4.3	4.5	4.7	4.6	4.8	5.1	4.2	4.3	6.2	5.1	4.7	4.7
% Filterer	73	43	48	63	67	54	72	24	73	35	71	71	18	26	65	54
Density	584	1052	1360	830	932	627	1543	848	1725	1992	706	353	1943	1271	2029	1186
EPT richness	16	20	18	16	19	19	22	22	22	22	25	19	21	23	24	21
Metals Tolerance index	4.2	4.6	4.7	4.5	4.2	4.7	4.4	4.6	4.7	5.3	4.1	4.1	6.9	4.4	4.5	4.7
Metric scores																
Taxa richness	3	5	4	3	4	4	4	5	6	5	6	5	4	5	6	5
Shannon diversity	4	6	5	6	6	6	4	6	5	6	6	6	4	6	6	5
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	3	6	6	6
Hydropsychinae/Trichoptera	2	6	6	3	6	6	6	6	3	6	5	5	6	6	5	5
Baetidae/Ephemeroptera	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	5	4	5	5	5	4	4	4	4	4	5	5	2	4	4	4
% Filterer	1	6	6	3	2	5	1	6	1	6	1	1	6	6	3	4
Density (high)	6	6	6	6	6	6	6	6	6	6	6	6	*	6	5	6
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6	6
EPT richness	4	5	5	4	5	5	6	6	6	6	6	6	5	6	6	5
Metals Tolerance index	5	5	5	5	5	5	5	5	5	4	5	5	3	5	5	5
Total	4.8	5.8	6.0	5.3	5.7	6.0	5.5	6.3	5.3	6.2	5.7	4.7	5.2	6.3	5.8	5.6
Organic subset	1.2	1.6	1.7	1.4	1.3	1.6	1.1	1.6	1.1	1.6	1.2	6	14	16	12	13
Metals subset	1.5	1.6	1.6	1.5	1.6	1.6	1.7	1.7	1.7	1.6	1.7	1.4	14	17	17	16
Bioassessment																
Overall	73%	88%	91%	80%	86%	91%	83%	95%	80%	94%	86%	78%	79%	95%	88%	86%
Organic subset	67%	89%	94%	78%	72%	89%	61%	89%	61%	89%	67%	50%	78%	89%	67%	76%
Metals subset	83%	89%	89%	83%	89%	89%	94%	94%	94%	94%	94%	78%	94%	94%	94%	89%

**C-23. Mean metric values and bioassessment scores for Bitterroot River near mouth:
Station 19 - August, 1986-2000 (4 Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	3.1	3.5	3.9	3.3	3.0	3.6	3.4	3.7	2.9	4.1	3.4	3.6	3.9	3.6	3.6	3.5
Shannon diversity	3.5	3.7	3.4	3.8	3.5	3.8	3.1	4.3	2.9	3.9	3.3	3.6	3.6	4.0	4.7	3.7
EPT/EPTC	0.83	0.77	0.81	0.80	0.91	0.72	0.68	0.73	0.78	0.81	0.91	0.92	0.87	0.84	0.72	0.81
Hydropsychinae/Trichoptera	0.96	0.91	0.96	0.73	0.83	0.89	0.92	0.73	0.90	0.68	0.82	0.71	0.83	0.44	0.86	0.81
Baetidae/Ephemeroptera	0.65	0.55	0.84	0.35	0.48	0.34	0.63	0.18	0.55	0.08	0.69	0.15	0.21	0.12	0.15	0.40
Biotic index	4.7	4.8	4.6	4.2	4.4	4.6	4.9	4.0	4.7	4.0	4.3	4.0	4.4	3.6	4.7	4.4
% Filterer	6.5	6.3	6.3	5.8	6.6	5.6	6.9	3.5	8.1	4.5	7.0	6.4	5.6	4.6	6.8	6.0
Density	890	1085	1243	792	936	810	1421	334	1870	938	1055	461	1242	425	874	958
EPT richness	16	20	21	19	17	18	18	21	14	22	18	18	22	20	20	19
Metals Tolerance index	4.7	4.4	4.8	3.8	4.4	4.9	4.7	3.1	4.6	3.9	4.4	4.1	4.3	3.7	3.9	4.2
Metric scores																
Taxa richness	4	5	5	4	4	5	4	5	4	5	3	6	4	5	5	5
Shannon diversity	6	6	6	6	6	6	5	6	4	6	5	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	3	2	6	6	4	3	6	4	6	6	6	6	6	5	5
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	4	4	4	5	5	4	4	5	4	5	5	5	5	6	4	5
% Filterer	3	3	3	4	2	4	2	6	*	6	6	2	3	4	6	3
Density (high)	6	6	6	6	6	6	6	6	3	6	6	6	*	6	6	6
Density (low)	6	6	6	6	6	6	6	6	3	6	6	6	5	6	4	6
EPT richness	4	5	5	5	4	5	5	5	4	6	5	5	6	5	5	5
Metals Tolerance index	5	5	5	6	5	5	5	6	5	6	5	5	5	6	6	5
Total	52	55	54	60	56	57	52	54	48	65	56	52	61	56	57	57
Organic subset	13	13	15	13	14	12	11	10	17	13	8	15	12	12	14	14
Metals subset	15	16	16	17	15	16	14	15	18	16	15	17	15	17	16	16
Bioassessment																
Overall	79%	83%	82%	91%	85%	86%	79%	90%	73%	98%	85%	87%	92%	93%	86%	85%
Organic subset	72%	72%	72%	83%	72%	78%	67%	92%	56%	94%	72%	67%	83%	100%	67%	75%
Metals subset	83%	89%	89%	94%	83%	89%	89%	78%	83%	100%	89%	83%	94%	83%	94%	88%

* not calculated if < 550

C-24. Mean metric values and bioassessment scores for Clark Fork River at Harper Bridge: Station 20, August, 1986-2000 (4 Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	28	33	31	29	28	32	39	31	41	33	31	36	37	44	34	
Shannon diversity	2.9	3.2	2.5	3.5	3.1	3.3	3.2	1.4	3.2	3.1	2.9	3.6	2.4	4.2	4.0	3.1
EPT/EPTC	0.92	0.76	0.84	0.59	0.74	0.78	0.53	0.81	0.77	0.78	0.90	0.91	0.86	0.72	0.58	0.77
Hydropsychinae/Trichopte	0.95	0.92	0.98	0.93	0.96	0.93	0.93	0.98	0.90	0.91	0.93	0.80	0.94	0.55	0.81	0.89
Baetidae/Ephemeroptera	0.86	0.84	0.85	0.66	0.72	0.62	0.83	0.75	0.68	0.43	0.77	0.40	0.39	0.28	0.19	0.62
Biotic index	4.7	4.9	4.5	5.4	5.2	4.7	5.4	4.9	4.7	4.9	4.7	4.6	4.0	4.8	4.5	4.8
% Filterer	68	68	74	52	64	61	47	90	67	63	71	62	74	42	34	62
Density	810	1519	4786	1391	1362	795	4369	4259	1658	2436	882	255	1594	364	999	1832
EPT richness	16	15	16	15	15	16	19	18	16	20	18	20	22	21	22	18
Metals Tolerance index	4.7	4.8	5.1	5.5	5.1	4.7	5.7	4.9	4.4	4.8	4.7	3.9	4.8	3.3	4.4	4.7
Metric scores																
Taxa richness	3	4	4	3	3	4	5	4	4	6	4	4	5	5	6	4
Shannon diversity	4	5	3	6	5	5	5	1	5	5	4	6	3	6	6	5
EPT/EPTC	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichopte	2	3	1	3	2	3	3	1	4	3	3	6	2	6	6	3
Baetidae/Ephemeroptera	5	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	4	4	5	3	3	3	6	4	4	4	4	5	4	5	4	4
% Filterer	2	2	1	5	3	3	6	0	2	3	1	3	1	6	6	3
Density (high)	6	6	1	6	6	6	2	2	6	5	6	*	6	6	5	5
Density (low)	6	6	6	6	6	6	6	6	6	6	6	3	6	4	6	6
EPT richness	4	4	4	4	4	4	5	5	4	5	5	5	6	5	6	5
Metals Tolerance index	5	5	4	4	4	5	4	5	5	5	5	6	5	6	5	5
Total	47	51	40.	52	48	52	50	40	52	54	50	50	50	55	63	50
Organic subset	12	12	7	14	12	13	11	6	12	11	8	11	11	11	11	11
Metals subset	15	15	14	14	14	15	15	16	15	16	16	14	17	15	17	15
Bioassessment																
Overall	71%	77%	61%	79%	73%	79%	76%	61%	79%	82%	76%	83%	76%	92%	95%	77%
Organic subset	67%	67%	39%	78%	67%	72%	61%	33%	67%	61%	67%	61%	92%	89%	66%	
Metals subset	83%	83%	78%	78%	78%	83%	83%	89%	89%	89%	78%	94%	83%	94%	84%	

C-25. Mean metric values and bioassessment scores for Clark Fork River at Huson: Station 22 - August, 1986-2000 (four Hess samples per year except eight samples in 1998).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	28	42	33	32	30	33	40	32	29	31	27	20	33	33	32	
Shannon diversity	2.5	3.4	2.8	3.9	3.7	2.7	3.3	3.0	2.5	2.9	3.4	3.0	3.1	4.0	3.2	
EPT/EPTC	0.94	0.79	0.82	0.63	0.70	0.83	0.50	0.73	0.70	0.68	0.82	0.96	0.85	0.79	0.77	
Hydropsychinae/Trichoptera	0.99	0.93	0.97	0.86	0.79	0.99	0.94	0.66	0.81	0.86	0.95	0.52	0.90	0.34	0.82	
Baetidae/Ephemeroptera	0.94	0.40	0.81	0.45	0.29	0.78	0.87	0.47	0.59	0.47	0.70	0.68	0.53	0.19	d	
Biotic index	4.8	4.9	4.6	4.9	4.3	4.8	5.3	4.6	4.6	4.7	4.8	3.2	4.6	4.5	4.6	
% Filterer	75	60	71	43	40	71	57	57	77	70	58	42	55	23	t	
Density	1396	1452	2680	819	516	882	2902	806	4296	1205	476	141	507	308	a	
EPT richness	16	21	17	18	17	20	15	15	15	15	16	12	18	19	17	
Metals Tolerance index	4.9	4.9	4.9	4.5	4.0	4.9	5.0	4.3	4.5	4.7	4.7	3.8	4.5	3.2	4.5	
Metric scores																
Taxa richness	3	6	4	4	4	4	4	6	4	3	4	3	2	4	4	
Shannon diversity	3	6	4	6	6	4	5	5	3	4	6	5	5	6	5	
EPT/EPTC	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	
Hydropsychinae/Trichoptera	1	3	1	5	6	1	2	6	6	5	2	6	4	6	4	
Baetidae/Ephemeroptera	2	6	6	6	6	6	5	6	6	6	6	6	6	6	6	
Biotic index	4	4	4	4	5	4	3	4	4	4	4	4	5	4	4	
% Filterer	1	4	1	6	6	*	6	4	4	0	2	4	6	5	4	
Density (high)	6	6	4	6	6	*	6	4	6	2	6	*	*	*	5	
Density (low)	6	6	6	6	5	6	6	6	6	6	6	5	1	5	5	
EPT richness	4	5	4	5	4	4	5	4	4	4	4	4	3	5	4	
Metals Tolerance index	5	5	5	5	5	5	4	5	5	5	5	6	5	6	5	
Total	41	57	45	59	53	47	49	56	45	52	45	47	49	53	50	
Organic subset	11	14	9	16	11	11	11	11	14	6	12	8	12	9	11	
Metals subset	15	16	15	16	14	15	15	15	15	15	14	10	15	14	15	
Bioassessment																
Overall	62%	86%	68%	89%	88%	71%	74%	85%	68%	79%	75%	78%	82%	88%	78%	
Organic subset	61%	78%	50%	89%	92%	61%	61%	78%	33%	67%	67%	100%	75%	92%	72%	
Metals subset	83%	89%	83%	89%	78%	83%	83%	83%	78%	56%	83%	56%	83%	78%	81%	

* not calculated if density is < 550

C-26. Mean metric values and bioassessment scores for Clark Fork River near Superior: Station 24 - August, 1986-2000 (four Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	.31	34	36	28	33	33	44	34	28	35	28	24	35	35	36	3.3
Shannon diversity	3.5	3.5	3.3	2.8	3.8	3.7	3.9	3.1	3.3	2.7	2.6	2.6	2.9	3.6	3.6	3.3
EPT/EPTC	0.84	0.76	0.80	0.84	0.81	0.83	0.70	0.65	0.82	0.83	0.94	0.94	0.95	0.91	0.84	0.82
Hydropsychinae/Trichoptera	0.73	0.96	0.97	0.91	0.86	0.90	0.90	0.86	0.93	0.77	0.91	0.92	0.91	0.78	0.85	0.88
Baetidae/Ephemeroptera	0.80	0.54	0.61	0.42	0.53	0.70	0.19	0.36	0.58	0.21	0.60	0.71	0.44	0.33	0.17	0.48
Biotic index	4.4	5.0	4.7	4.8	4.6	4.5	4.9	4.4	4.5	4.1	4.5	4.3	4.7	4.3	4.2	4.5
% Filterer	55	61	61	74	56	54	49	53	74	64	78	84	75	59	58	64
Density	537	1100	2738	1088	725	463	955	975	2084	1102	873	843	848	757	929	1068
EPT richness	18	17	20	17	22	19	26	18	16	20	15	14	22	22	24	19
Metals Tolerance index	3.9	4.6	4.4	4.7	4.4	4.7	4.6	4.0	4.5	3.9	4.6	4.3	4.8	4.2	3.9	4.3
Metric scores																
Taxa richness	4	4	5	3	4	4	6	4	3	5	3	2	5	5	5	4
Shannon diversity	6	6	5	4	6	6	6	5	5	4	4	4	6	6	6	5
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	2	1	3	5	4	4	5	3	6	3	3	3	6	5	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	5	4	4	4	4	5	4	5	5	5	5	5	4	5	5	5
% Filterer	5	3	3	1	4	5	6	5	1	3	0	0	1	4	4	3
Density (high)	*	6	4	6	6	*	6	6	5	6	6	6	6	6	6	6
Density (low)	5	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6
EPT richness	5	4	5	4	6	5	6	5	4	5	4	4	6	6	6	5
Metals Tolerance index	6	5	5	5	5	5	5	6	5	6	5	5	5	5	6	5
Bioassessment																
Overall	90%	79%	76%	73%	88%	85%	92%	91%	74%	89%	73%	71%	79%	92%	92%	83%
Organic subset	83%	72%	61%	78%	83%	89%	61%	78%	61%	78%	61%	61%	61%	83%	83%	74%
Metals subset	89%	83%	89%	83%	94%	83%	94%	94%	94%	83%	94%	83%	94%	94%	100%	90%

* not calculated if density is < 550

**C-27. Mean metric values and bioassessment scores for Clark Fork River above the Flathead River:
Station 25 - August, 1986-2000 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values																
Taxa richness	25	31	37	27	29	35	40	37	36	42	37	25	33	38	40	34
Shannon diversity	3.4	3.3	3.3	3.4	3.8	3.7	3.4	3.3	4.0	3.2	2.7	3.4	3.9	3.3	3.3	3.5
EPT/EPTC	0.79	0.66	0.66	0.61	0.58	0.71	0.64	0.55	0.46	0.70	0.66	0.69	0.81	0.67	0.56	0.65
Hydropsychinae/Trichoptera	0.70	0.90	0.96	0.98	0.91	0.96	0.91	0.95	0.91	0.76	0.95	0.93	0.78	0.77	0.87	0.88
Baetidae/Ephemeroptera	0.58	0.60	0.60	0.41	0.33	0.31	0.22	0.21	0.21	0.17	0.39	0.27	0.32	0.22	0.21	0.34
Biotic index	4.5	5.0	4.8	4.9	4.9	4.7	5.0	4.9	5.1	4.4	4.9	4.7	4.6	4.6	5.0	4.8
% Filterer	50	53	57	64	63	55	54	72	64	45	76	88	58	54	74	62
Density	249	1102	2097	1030	672	633	1355	684	1955	654	739	558	918	350	1054	937
EPT richness	14	15	20	15	17	16	20	19	18	23	20	15	21	21	22	18
Metals Tolerance index	3.7	3.9	3.9	4.3	3.8	4.6	4.7	3.1	3.3	3.2	3.5	3.3	4.3	3.0	3.0	3.7
Metric scores																
Taxa richness	3	4	5	3	3	5	6	5	5	6	5	3	4	5	6	5
Shannon diversity	6	5	5	6	6	6	6	5	6	5	4	6	6	5	6	6
EPT/EPTC	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	4	2	1	3	2	3	2	3	6	2	3	6	6	5	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Biotic index	5	4	4	4	4	4	4	4	4	4	5	4	4	4	4	4
% Filterer	6	5	4	3	3	5	5	1	3	6	0	0	4	5	1	3
Density (high)	*	6	5	6	6	6	6	6	6	6	6	6	6	*	6	6
Density (low)	2	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6
EPT richness	4	4	5	4	4	4	5	5	5	6	5	4	5	5	6	5
Metals Tolerance index	6	6	6	5	6	5	5	6	6	6	6	6	5	6	6	6
Total	50	56	54	50	53	55	58	53	54	65	51	48	58	53	57	54
Organic subset	11	15	13	13	15	15	15	11	13	17	10	10	14	9	11	13
Metals subset	12	16	17	15	16	15	16	17	17	18	17	16	16	15	18	16
Bioassessment																
Overall	83%	85%	82%	76%	80%	83%	88%	80%	82%	98%	77%	73%	88%	88%	86%	83%
Organic subset	92%	83%	72%	72%	83%	83%	61%	72%	94%	56%	56%	78%	75%	61%	74%	74%
Metals subset	67%	89%	94%	83%	89%	83%	94%	94%	100%	94%	94%	89%	83%	100%	89%	89%

* not calculated if density is < 550

**C-28. Mean metric values and bioassessment scores for Clark Fork River above Thompson Falls Reservoir:
Station 27 - August, 1987-2000 (four Hess samples per year).**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Mean
Metric values															
Taxa richness	26	26	21	29	31	23	27	25	25	n	24	26	34	24	26
Shannon diversity	2.9	2.8	2.6	2.9	2.9	2.7	3.0	2.8	2.7	0	4.0	3.4	3.9	3.1	3.1
EPT/EPTC	0.79	0.91	0.58	0.83	0.87	0.79	0.51	0.93	0.86	0.61	0.69	0.78	0.95	0.78	
Hydropsychinae/Trichoptera	0.96	0.94	0.98	0.91	0.93	0.98	0.88	0.83	0.83	q	0.72	0.90	0.66	0.73	0.87
Baetidae/Ephemeroptera	0.34	0.31	0.24	0.54	0.37	0.04	0.22	0.09	0.31	u	0.21	0.17	0.32	0.02	0.24
Biotic index	5.2	5.0	5.3	4.8	4.7	5.1	5.3	4.2	4.4	a	5.1	5.2	4.5	4.0	4.8
% Filterer	67	78	75	76	69	73	66	64	71	l	33	45	51	51	63
Density	525	851	838	520	486	627	313	463	287	i	84	240	254	259	442
EPT richness	12	12	9	17	18	9	11	13	12	t	12	13	17	12	13
Metals Tolerance index	4.9	4.5	4.2	4.2	5.1	3.9	2.8	4.0	4.0	a	4.1	4.2	3.5	3.4	4.1
Metric scores															
Taxa richness	3	3	2	3	4	2	3	3	3	e	2	3	4	2	3
Shannon diversity	4	4	4	4	4	4	5	4	4	d	6	6	6	5	5
EPT/EPTC	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	2	1	3	3	1	4	6	6	a	6	4	6	4	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	t	6	6	6	6	6
Biotic index	3	4	3	4	4	4	3	5	5	a	4	3	5	5	4
% Filterer	2	0	1	0	2	1	2	3	1	*	6	5	5	5	3
Density (high)	*	6	6	*	*	6	*	*	*	*	*	*	*	*	6
Density (low)	5	6	6	5	5	6	3	5	3	1	2	3	3	3	4
EPT richness	3	3	2	4	5	2	3	3	3	3	3	4	3	3	3
Metals Tolerance index	5	5	5	5	4	6	6	6	6	5	5	6	6	5	5
Total	39	45	42	40	43	44	40	47	43	45	44	51	47	44	
Organic subset	5	10	10	4	6	11	5	8	6	10	9	10	10	10	8
Metals subset	13	14	13	14	14	14	12	14	12	9	10	13	12	13	13
Bioassessment															
Overall	65%	68%	64%	67%	72%	67%	67%	78%	72%	75%	73%	85%	78%	72%	72%
Organic subset	42%	56%	56%	33%	50%	61%	42%	67%	50%	83%	75%	83%	83%	60%	60%
Metals subset	72%	78%	72%	78%	78%	78%	67%	78%	67%	50%	56%	72%	67%	70%	70%

APPENDIX D:

RBP habitat assessment scores for Clark Fork Basin
monitoring stations, 2000

APPENDIX D. Clark Fork River Basin aquatic and riparian habitat data.

Habitat Assessment- MDEQ RBP Field Sheet		August, 2000 - Investigator: D. McGuire																								
metric	station: SF-1	0	1	2.5	4.5	5	6	7	8	8.5	9	10	10.2	11	11.5	11.7	12	12.5	13	14	15.5	18	19	20	24	25
Riffle Development	2	6	5	8	9	8	7	7	6	6	9	6	9	9	8	10	10	10	10	6	9	3	10	5		
Benthic Substrate	5	6	5	6	8	6	6	6	7	7	6	9	6	7	7	9	10	9	10	9	8	9	10	9		
Embeddedness	6	11	9	15	12	14	14	6	8	8	11	7	16	8	12	12	13	13	19	16	17	19	18	16	18	
Channel Alteration	5	19	12	16	20	15	12	19	18	11	15	16	14	13	15	14	13	15	19	16	18	16	19	17	16	15
Sediment Deposition	8	11	11	10	10	10	12	16	14	12	10	10	16	10	13	12	14	16	16	17	14	15	17	13	16	18
Flow Status	18	19	18	16	16	16	19	16	14	15	13	13	12	14	10	15	13	16	13	15	11	14	15	12	14	11
Bank Stability	20	20	11	14	18	18	20	20	16	14	17	9	16	15	15	11	13	16	15	18	16	12	16	18	19	18
Bank Vegetation	16	18	12	10	16	16	15	20	19	17	17	14	18	16	14	16	12	12	18	14	17	16	12	13	18	
Riparian Width	14	20	13	12	19	20	13	20	20	17	15	16	15	12	18	19	16	13	16	17	20	18	14	18	6	17
Total Score	94	130	96	107	128	123	118	130	121	107	114	97	125	103	112	121	117	128	126	136	130	129	130	116	119	132
% of max possible	59%	81%	60%	67%	80%	77%	74%	81%	76%	67%	71%	61%	78%	64%	70%	76%	73%	80%	79%	85%	81%	81%	81%	73%	74%	83%
Embeddedness (visual estimate)																										
% Embedded (reach)	70	50	55	50	40	50	25	70	60	50	60	25	60	50	40	5	20	20	10	20	25	30	20			
% Embedded (Hess site)	40	50	30	25	30	40	20	40	30	40	30	50	20	50	30	30	15	20	15	10	10	25	25	20		
riffle substrate composition (visual estimate)																										
boulder (>256mm)	35	1	-	1	-	-	-	-	-	5	1	2	3	1	-	2	5	1	5	15	2	1	1	-	2	
cobble (64-256mm)	5	30	25	60	35	40	25	30	30	35	60	35	75	40	45	50	60	75	60	55	65	80	75	40	10	70
gravel (2-64mm)	15	30	25	10	50	40	60	60	50	40	25	40	15	35	30	30	30	15	30	30	10	10	20	40	60	15
sand (0.06-2mm)	35	30	40	30	10	20	10	5	15	5	20	10	20	20	10	5	10	5	5	10	5	5	15	25	10	
silt (<0.06mm)	10	10	10	2	5	1	5	5	5	3	5	1	2	5	2	1	1	1	1	3	1	1	5	2		

